

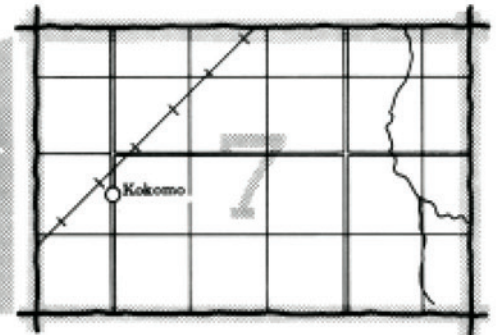
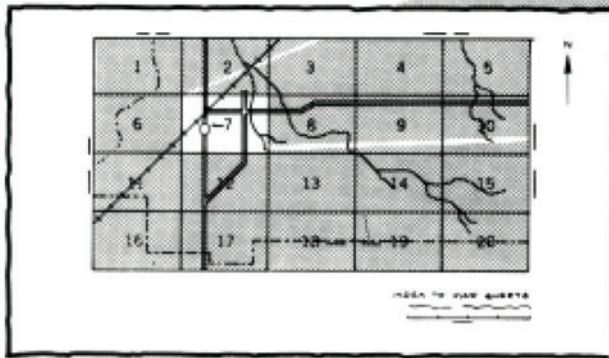


# **Soil Survey of Pope County Arkansas**

United States Department of Agriculture  
Soil Conservation Service and Forest Service  
in cooperation with  
Arkansas Agricultural Experiment Station

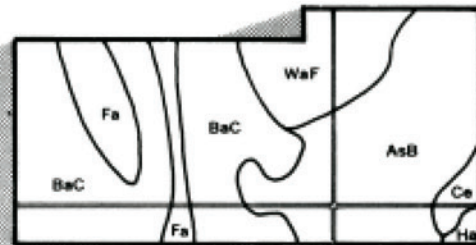
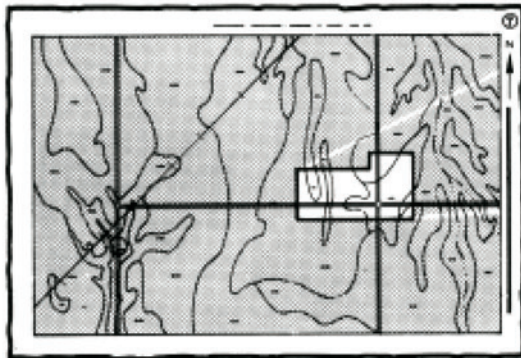
# HOW TO USE

1. Locate your area of interest on the "Index to Map Sheets"

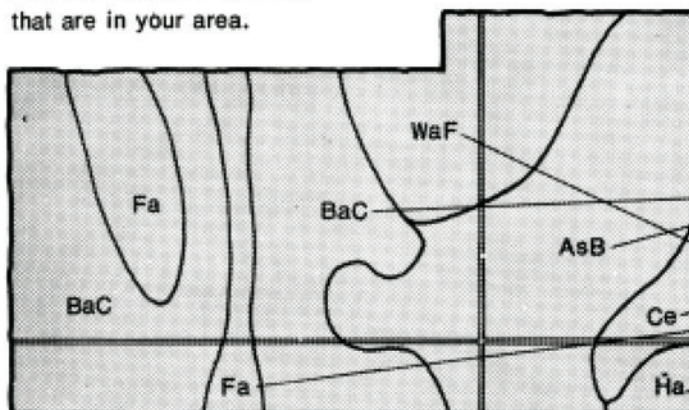


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



4. List the map unit symbols that are in your area.



## Symbols

AsB

BaC

Ce

Fa

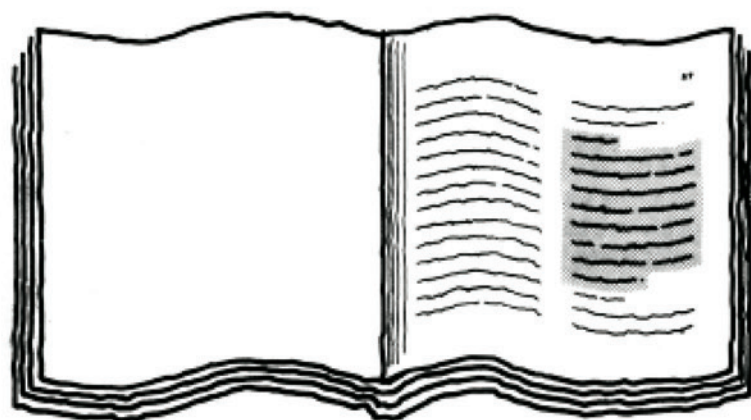
Ha

WaF




# THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



| Selling Commission           |        | Selling Commission           |        |
|------------------------------|--------|------------------------------|--------|
| 1. 100,000 - 200,000         | 1.00%  | 1. 100,000 - 200,000         | 1.00%  |
| 2. 200,000 - 300,000         | 1.25%  | 2. 200,000 - 300,000         | 1.25%  |
| 3. 300,000 - 400,000         | 1.50%  | 3. 300,000 - 400,000         | 1.50%  |
| 4. 400,000 - 500,000         | 1.75%  | 4. 400,000 - 500,000         | 1.75%  |
| 5. 500,000 - 600,000         | 2.00%  | 5. 500,000 - 600,000         | 2.00%  |
| 6. 600,000 - 700,000         | 2.25%  | 6. 600,000 - 700,000         | 2.25%  |
| 7. 700,000 - 800,000         | 2.50%  | 7. 700,000 - 800,000         | 2.50%  |
| 8. 800,000 - 900,000         | 2.75%  | 8. 800,000 - 900,000         | 2.75%  |
| 9. 900,000 - 1,000,000       | 3.00%  | 9. 900,000 - 1,000,000       | 3.00%  |
| 10. 1,000,000 - 1,100,000    | 3.25%  | 10. 1,000,000 - 1,100,000    | 3.25%  |
| 11. 1,100,000 - 1,200,000    | 3.50%  | 11. 1,100,000 - 1,200,000    | 3.50%  |
| 12. 1,200,000 - 1,300,000    | 3.75%  | 12. 1,200,000 - 1,300,000    | 3.75%  |
| 13. 1,300,000 - 1,400,000    | 4.00%  | 13. 1,300,000 - 1,400,000    | 4.00%  |
| 14. 1,400,000 - 1,500,000    | 4.25%  | 14. 1,400,000 - 1,500,000    | 4.25%  |
| 15. 1,500,000 - 1,600,000    | 4.50%  | 15. 1,500,000 - 1,600,000    | 4.50%  |
| 16. 1,600,000 - 1,700,000    | 4.75%  | 16. 1,600,000 - 1,700,000    | 4.75%  |
| 17. 1,700,000 - 1,800,000    | 5.00%  | 17. 1,700,000 - 1,800,000    | 5.00%  |
| 18. 1,800,000 - 1,900,000    | 5.25%  | 18. 1,800,000 - 1,900,000    | 5.25%  |
| 19. 1,900,000 - 2,000,000    | 5.50%  | 19. 1,900,000 - 2,000,000    | 5.50%  |
| 20. 2,000,000 - 2,100,000    | 5.75%  | 20. 2,000,000 - 2,100,000    | 5.75%  |
| 21. 2,100,000 - 2,200,000    | 6.00%  | 21. 2,100,000 - 2,200,000    | 6.00%  |
| 22. 2,200,000 - 2,300,000    | 6.25%  | 22. 2,200,000 - 2,300,000    | 6.25%  |
| 23. 2,300,000 - 2,400,000    | 6.50%  | 23. 2,300,000 - 2,400,000    | 6.50%  |
| 24. 2,400,000 - 2,500,000    | 6.75%  | 24. 2,400,000 - 2,500,000    | 6.75%  |
| 25. 2,500,000 - 2,600,000    | 7.00%  | 25. 2,500,000 - 2,600,000    | 7.00%  |
| 26. 2,600,000 - 2,700,000    | 7.25%  | 26. 2,600,000 - 2,700,000    | 7.25%  |
| 27. 2,700,000 - 2,800,000    | 7.50%  | 27. 2,700,000 - 2,800,000    | 7.50%  |
| 28. 2,800,000 - 2,900,000    | 7.75%  | 28. 2,800,000 - 2,900,000    | 7.75%  |
| 29. 2,900,000 - 3,000,000    | 8.00%  | 29. 2,900,000 - 3,000,000    | 8.00%  |
| 30. 3,000,000 - 3,100,000    | 8.25%  | 30. 3,000,000 - 3,100,000    | 8.25%  |
| 31. 3,100,000 - 3,200,000    | 8.50%  | 31. 3,100,000 - 3,200,000    | 8.50%  |
| 32. 3,200,000 - 3,300,000    | 8.75%  | 32. 3,200,000 - 3,300,000    | 8.75%  |
| 33. 3,300,000 - 3,400,000    | 9.00%  | 33. 3,300,000 - 3,400,000    | 9.00%  |
| 34. 3,400,000 - 3,500,000    | 9.25%  | 34. 3,400,000 - 3,500,000    | 9.25%  |
| 35. 3,500,000 - 3,600,000    | 9.50%  | 35. 3,500,000 - 3,600,000    | 9.50%  |
| 36. 3,600,000 - 3,700,000    | 9.75%  | 36. 3,600,000 - 3,700,000    | 9.75%  |
| 37. 3,700,000 - 3,800,000    | 10.00% | 37. 3,700,000 - 3,800,000    | 10.00% |
| 38. 3,800,000 - 3,900,000    | 10.25% | 38. 3,800,000 - 3,900,000    | 10.25% |
| 39. 3,900,000 - 4,000,000    | 10.50% | 39. 3,900,000 - 4,000,000    | 10.50% |
| 40. 4,000,000 - 4,100,000    | 10.75% | 40. 4,000,000 - 4,100,000    | 10.75% |
| 41. 4,100,000 - 4,200,000    | 11.00% | 41. 4,100,000 - 4,200,000    | 11.00% |
| 42. 4,200,000 - 4,300,000    | 11.25% | 42. 4,200,000 - 4,300,000    | 11.25% |
| 43. 4,300,000 - 4,400,000    | 11.50% | 43. 4,300,000 - 4,400,000    | 11.50% |
| 44. 4,400,000 - 4,500,000    | 11.75% | 44. 4,400,000 - 4,500,000    | 11.75% |
| 45. 4,500,000 - 4,600,000    | 12.00% | 45. 4,500,000 - 4,600,000    | 12.00% |
| 46. 4,600,000 - 4,700,000    | 12.25% | 46. 4,600,000 - 4,700,000    | 12.25% |
| 47. 4,700,000 - 4,800,000    | 12.50% | 47. 4,700,000 - 4,800,000    | 12.50% |
| 48. 4,800,000 - 4,900,000    | 12.75% | 48. 4,800,000 - 4,900,000    | 12.75% |
| 49. 4,900,000 - 5,000,000    | 13.00% | 49. 4,900,000 - 5,000,000    | 13.00% |
| 50. 5,000,000 - 5,100,000    | 13.25% | 50. 5,000,000 - 5,100,000    | 13.25% |
| 51. 5,100,000 - 5,200,000    | 13.50% | 51. 5,100,000 - 5,200,000    | 13.50% |
| 52. 5,200,000 - 5,300,000    | 13.75% | 52. 5,200,000 - 5,300,000    | 13.75% |
| 53. 5,300,000 - 5,400,000    | 14.00% | 53. 5,300,000 - 5,400,000    | 14.00% |
| 54. 5,400,000 - 5,500,000    | 14.25% | 54. 5,400,000 - 5,500,000    | 14.25% |
| 55. 5,500,000 - 5,600,000    | 14.50% | 55. 5,500,000 - 5,600,000    | 14.50% |
| 56. 5,600,000 - 5,700,000    | 14.75% | 56. 5,600,000 - 5,700,000    | 14.75% |
| 57. 5,700,000 - 5,800,000    | 15.00% | 57. 5,700,000 - 5,800,000    | 15.00% |
| 58. 5,800,000 - 5,900,000    | 15.25% | 58. 5,800,000 - 5,900,000    | 15.25% |
| 59. 5,900,000 - 6,000,000    | 15.50% | 59. 5,900,000 - 6,000,000    | 15.50% |
| 60. 6,000,000 - 6,100,000    | 15.75% | 60. 6,000,000 - 6,100,000    | 15.75% |
| 61. 6,100,000 - 6,200,000    | 16.00% | 61. 6,100,000 - 6,200,000    | 16.00% |
| 62. 6,200,000 - 6,300,000    | 16.25% | 62. 6,200,000 - 6,300,000    | 16.25% |
| 63. 6,300,000 - 6,400,000    | 16.50% | 63. 6,300,000 - 6,400,000    | 16.50% |
| 64. 6,400,000 - 6,500,000    | 16.75% | 64. 6,400,000 - 6,500,000    | 16.75% |
| 65. 6,500,000 - 6,600,000    | 17.00% | 65. 6,500,000 - 6,600,000    | 17.00% |
| 66. 6,600,000 - 6,700,000    | 17.25% | 66. 6,600,000 - 6,700,000    | 17.25% |
| 67. 6,700,000 - 6,800,000    | 17.50% | 67. 6,700,000 - 6,800,000    | 17.50% |
| 68. 6,800,000 - 6,900,000    | 17.75% | 68. 6,800,000 - 6,900,000    | 17.75% |
| 69. 6,900,000 - 7,000,000    | 18.00% | 69. 6,900,000 - 7,000,000    | 18.00% |
| 70. 7,000,000 - 7,100,000    | 18.25% | 70. 7,000,000 - 7,100,000    | 18.25% |
| 71. 7,100,000 - 7,200,000    | 18.50% | 71. 7,100,000 - 7,200,000    | 18.50% |
| 72. 7,200,000 - 7,300,000    | 18.75% | 72. 7,200,000 - 7,300,000    | 18.75% |
| 73. 7,300,000 - 7,400,000    | 19.00% | 73. 7,300,000 - 7,400,000    | 19.00% |
| 74. 7,400,000 - 7,500,000    | 19.25% | 74. 7,400,000 - 7,500,000    | 19.25% |
| 75. 7,500,000 - 7,600,000    | 19.50% | 75. 7,500,000 - 7,600,000    | 19.50% |
| 76. 7,600,000 - 7,700,000    | 19.75% | 76. 7,600,000 - 7,700,000    | 19.75% |
| 77. 7,700,000 - 7,800,000    | 20.00% | 77. 7,700,000 - 7,800,000    | 20.00% |
| 78. 7,800,000 - 7,900,000    | 20.25% | 78. 7,800,000 - 7,900,000    | 20.25% |
| 79. 7,900,000 - 8,000,000    | 20.50% | 79. 7,900,000 - 8,000,000    | 20.50% |
| 80. 8,000,000 - 8,100,000    | 20.75% | 80. 8,000,000 - 8,100,000    | 20.75% |
| 81. 8,100,000 - 8,200,000    | 21.00% | 81. 8,100,000 - 8,200,000    | 21.00% |
| 82. 8,200,000 - 8,300,000    | 21.25% | 82. 8,200,000 - 8,300,000    | 21.25% |
| 83. 8,300,000 - 8,400,000    | 21.50% | 83. 8,300,000 - 8,400,000    | 21.50% |
| 84. 8,400,000 - 8,500,000    | 21.75% | 84. 8,400,000 - 8,500,000    | 21.75% |
| 85. 8,500,000 - 8,600,000    | 22.00% | 85. 8,500,000 - 8,600,000    | 22.00% |
| 86. 8,600,000 - 8,700,000    | 22.25% | 86. 8,600,000 - 8,700,000    | 22.25% |
| 87. 8,700,000 - 8,800,000    | 22.50% | 87. 8,700,000 - 8,800,000    | 22.50% |
| 88. 8,800,000 - 8,900,000    | 22.75% | 88. 8,800,000 - 8,900,000    | 22.75% |
| 89. 8,900,000 - 9,000,000    | 23.00% | 89. 8,900,000 - 9,000,000    | 23.00% |
| 90. 9,000,000 - 9,100,000    | 23.25% | 90. 9,000,000 - 9,100,000    | 23.25% |
| 91. 9,100,000 - 9,200,000    | 23.50% | 91. 9,100,000 - 9,200,000    | 23.50% |
| 92. 9,200,000 - 9,300,000    | 23.75% | 92. 9,200,000 - 9,300,000    | 23.75% |
| 93. 9,300,000 - 9,400,000    | 24.00% | 93. 9,300,000 - 9,400,000    | 24.00% |
| 94. 9,400,000 - 9,500,000    | 24.25% | 94. 9,400,000 - 9,500,000    | 24.25% |
| 95. 9,500,000 - 9,600,000    | 24.50% | 95. 9,500,000 - 9,600,000    | 24.50% |
| 96. 9,600,000 - 9,700,000    | 24.75% | 96. 9,600,000 - 9,700,000    | 24.75% |
| 97. 9,700,000 - 9,800,000    | 25.00% | 97. 9,700,000 - 9,800,000    | 25.00% |
| 98. 9,800,000 - 9,900,000    | 25.25% | 98. 9,800,000 - 9,900,000    | 25.25% |
| 99. 9,900,000 - 10,000,000   | 25.50% | 99. 9,900,000 - 10,000,000   | 25.50% |
| 100. 10,000,000 - 10,100,000 | 25.75% | 100. 10,000,000 - 10,100,000 | 25.75% |
| 101. 10,100,000 - 10,200,000 | 26.00% | 101. 10,100,000 - 10,200,000 | 26.00% |
| 102. 10,200,000 - 10,300,000 | 26.25% | 102. 10,200,000 - 10,300,000 | 26.25% |
| 103. 10,300,000 - 10,400,000 | 26.50% | 103. 10,300,000 - 10,400,000 | 26.50% |
| 104. 10,400,000 - 10,500,000 | 26.75% | 104. 10,400,000 - 10,500,000 | 26.75% |
| 105. 10,500,000 - 10,600,000 | 27.00% | 105. 10,500,000 - 10,600,000 | 27.00% |
| 106. 10,600,000 - 10,700,000 | 27.25% | 106. 10,600,000 - 10,700,000 | 27.25% |
| 107. 10,700,000 - 10,800,000 | 27.50% | 107. 10,700,000 - 10,800,000 | 27.50% |
| 108. 10,800,000 - 10,900,000 | 27.75% | 108. 10,800,000 - 10,900,000 | 27.75% |
| 109. 10,900,000 - 11,000,000 | 28.00% | 109. 10,900,000 - 11,000,000 | 28.00% |
| 110. 11,000,000 - 11,100,000 | 28.25% | 110. 11,000,000 - 11,100,000 | 28.25% |
| 111. 11,100,000 - 11,200,000 | 28.50% | 111. 11,100,000 - 11,200,000 | 28.50% |
| 112. 11,200,000 - 11,300,000 | 28.75% | 112. 11,200,000 - 11,300,000 | 28.75% |
| 113. 11,300,000 - 11,400,000 | 29.00% | 113. 11,300,000 - 11,400,000 | 29.00% |
| 114. 11,400,000 - 11,500,000 | 29.25% | 114. 11,400,000 - 11,500,000 | 29.25% |
| 115. 11,500,000 - 11,600,000 | 29.50% | 115. 11,500,000 - 11,600,000 | 29.50% |
| 116. 11,600,000 - 11,700,000 | 29.75% | 116. 11,600,000 - 11,700,000 | 29.75% |
| 117. 11,700,000 - 11,800,000 | 30.00% | 117. 11,700,000 - 11,800,000 | 30.00% |
| 118. 11,800,000 - 11,900,000 | 30.25% | 118. 11,800,000 - 11,900,000 | 30.25% |
| 119. 11,900,000 - 12,000,000 | 30.50% | 119. 11,900,000 - 12,000,000 | 30.50% |
| 120. 12,000,000 - 12,100,000 | 30.75% | 120. 12,000,000 - 12,100,000 | 30.75% |
| 121. 12,100,000 - 12,200,000 | 31.00% | 121. 12,100,000 - 12,200,000 | 31.00% |
| 122. 12,200,000 - 12,300,000 | 31.25% | 122. 12,200,000 - 12,300,000 | 31.25% |
| 123. 12,300,000 - 12,400,000 | 31.50% | 123. 12,300,000 - 12,400,000 | 31.50% |
| 124. 12,400,000 - 12,500,000 | 31.75% | 124. 12,400,000 - 12,500,000 | 31.75% |
| 125. 12,500,000 - 12,600,000 | 32.00% | 125. 12,500,000 - 12,600,000 | 32.00% |
| 126. 12,600,000 - 12,700,000 | 32.25% | 126. 12,600,000 - 12,700,000 | 32.25% |
| 127. 12,700,000 - 12,800,000 | 32.50% | 127. 12,700,000 - 12,800,000 | 32.50% |
| 128. 12,800,000 - 12,900,000 | 32.75% | 128. 12,800,000 - 12,900,000 | 32.75% |
| 129. 12,900,000 - 13,000,000 | 33.00% | 129. 12,900,000 - 13,000,000 | 33.00% |
| 130. 13,000,000 - 13,100,000 | 33.25% | 130. 13,000,000 - 13,100,000 | 33.25% |
| 131. 13,100,000 - 13,200,000 | 33.50% | 131. 13,100,000 - 13,200,000 | 33.50% |
| 132. 13,200,000 - 13,300,000 | 33.75% | 132. 13,200,000 - 13,300,000 | 33.75% |
| 133. 13,300,000 - 13,400,000 | 34.00% | 133. 13,300,000 - 13,400,000 | 34.00% |
| 134. 13,400,000 - 13,500,000 | 34.25% | 134. 13,400,000 - 13,500,000 | 34.25% |
| 135. 13,500,000 - 13,600,000 | 34.50% | 135. 13,500,000 - 13,600,000 | 34.50% |
| 136. 13,600,000 - 13,700,000 | 34.75% | 136. 13,600,000 - 13,700,000 | 34.75% |
| 137. 13,700,000 - 13,800,000 | 35.00% | 137. 13,700,000 - 13,800,000 | 35.00% |
| 138. 13,800,000 - 13,900,000 | 35.25% | 138. 13,800,000 - 13,900,000 | 35.25% |
| 139. 13,900,000 - 14,000,000 | 35.50% | 139. 13,900,000 - 14,000,000 | 35.50% |
| 140. 14,000,000 - 14,100,000 | 35.75% | 140. 14,000,000 - 14,100,000 | 35.75% |
| 141. 14,100,000 - 14,200,000 | 36.00% | 141. 14,100,000 - 14,200,000 | 36.00% |
| 142. 14,200,000 - 14,300,000 | 36.25% | 142. 14,200,000 - 14,300,000 | 36.25% |
| 143. 14,300,000 - 14,400,000 | 36.50% | 143. 14,300,000 - 14,400,000 | 36.50% |
| 144. 14,400,000 - 14,500,000 | 36.75% | 144. 14,400,000 - 14,500,000 | 36.75% |
| 145. 14,500,000 - 14,600,000 | 37.00% | 145. 14,500,000 - 14,600,000 | 37.00% |
| 146. 14,600,000 - 14,700,000 | 37.25% | 146. 14,600,000 - 14,700,000 | 37.25% |
| 147. 14,700,000 - 14,800,000 | 37.50% | 147. 14,700,000 - 14,800,000 | 37.50% |
| 148. 14,800,000 - 14,900,000 | 37.75% | 148. 14,800,000 - 14,900,000 | 37.75% |
| 149. 14,900,000 - 15,000,000 | 38.00% | 149. 14,900,000 - 15,000,000 | 38.0   |

- 6.** See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



| Year | Number of species of fish | Number of fishery |
|------|---------------------------|-------------------|
| 1950 | 100                       | 100               |
| 1951 | 100                       | 100               |
| 1952 | 100                       | 100               |
| 1953 | 100                       | 100               |
| 1954 | 100                       | 100               |
| 1955 | 100                       | 100               |
| 1956 | 100                       | 100               |
| 1957 | 100                       | 100               |
| 1958 | 100                       | 100               |
| 1959 | 100                       | 100               |
| 1960 | 100                       | 100               |
| 1961 | 100                       | 100               |
| 1962 | 100                       | 100               |
| 1963 | 100                       | 100               |
| 1964 | 100                       | 100               |
| 1965 | 100                       | 100               |
| 1966 | 100                       | 100               |
| 1967 | 100                       | 100               |
| 1968 | 100                       | 100               |
| 1969 | 100                       | 100               |
| 1970 | 100                       | 100               |
| 1971 | 100                       | 100               |
| 1972 | 100                       | 100               |
| 1973 | 100                       | 100               |
| 1974 | 100                       | 100               |
| 1975 | 100                       | 100               |
| 1976 | 100                       | 100               |
| 1977 | 100                       | 100               |
| 1978 | 100                       | 100               |
| 1979 | 100                       | 100               |
| 1980 | 100                       | 100               |
| 1981 | 100                       | 100               |
| 1982 | 100                       | 100               |
| 1983 | 100                       | 100               |
| 1984 | 100                       | 100               |
| 1985 | 100                       | 100               |
| 1986 | 100                       | 100               |
| 1987 | 100                       | 100               |
| 1988 | 100                       | 100               |
| 1989 | 100                       | 100               |
| 1990 | 100                       | 100               |
| 1991 | 100                       | 100               |
| 1992 | 100                       | 100               |
| 1993 | 100                       | 100               |
| 1994 | 100                       | 100               |
| 1995 | 100                       | 100               |
| 1996 | 100                       | 100               |
| 1997 | 100                       | 100               |
| 1998 | 100                       | 100               |
| 1999 | 100                       | 100               |
| 2000 | 100                       | 100               |
| 2001 | 100                       | 100               |
| 2002 | 100                       | 100               |
| 2003 | 100                       | 100               |
| 2004 | 100                       | 100               |
| 2005 | 100                       | 100               |
| 2006 | 100                       | 100               |
| 2007 | 100                       | 100               |
| 2008 | 100                       | 100               |
| 2009 | 100                       | 100               |
| 2010 | 100                       | 100               |
| 2011 | 100                       | 100               |
| 2012 | 100                       | 100               |
| 2013 | 100                       | 100               |
| 2014 | 100                       | 100               |
| 2015 | 100                       | 100               |
| 2016 | 100                       | 100               |
| 2017 | 100                       | 100               |
| 2018 | 100                       | 100               |
| 2019 | 100                       | 100               |
| 2020 | 100                       | 100               |
| 2021 | 100                       | 100               |
| 2022 | 100                       | 100               |
| 2023 | 100                       | 100               |
| 2024 | 100                       | 100               |
| 2025 | 100                       | 100               |
| 2026 | 100                       | 100               |
| 2027 | 100                       | 100               |
| 2028 | 100                       | 100               |
| 2029 | 100                       | 100               |
| 2030 | 100                       | 100               |
| 2031 | 100                       | 100               |
| 2032 | 100                       | 100               |
| 2033 | 100                       | 100               |
| 2034 | 100                       | 100               |
| 2035 | 100                       | 100               |
| 2036 | 100                       | 100               |
| 2037 | 100                       | 100               |
| 2038 | 100                       | 100               |
| 2039 | 100                       | 100               |
| 2040 | 100                       | 100               |
| 2041 | 100                       | 100               |
| 2042 | 100                       | 100               |
| 2043 | 100                       | 100               |
| 2044 | 100                       | 100               |
| 2045 | 100                       | 100               |
| 2046 | 100                       | 100               |
| 2047 | 100                       | 100               |
| 2048 | 100                       | 100               |
| 2049 | 100                       | 100               |
| 2050 | 100                       | 100               |
| 2051 | 100                       | 100               |
| 2052 | 100                       | 100               |
| 2053 | 100                       | 100               |
| 2054 | 100                       | 100               |
| 2055 | 100                       | 100               |
| 2056 | 100                       | 100               |
| 2057 | 100                       | 100               |
| 2058 | 100                       | 100               |
| 2059 | 100                       | 100               |
| 2060 | 100                       | 100               |
| 2061 | 100                       | 100               |
| 2062 | 100                       | 100               |
| 2063 | 100                       | 100               |
| 2064 | 100                       | 100               |

| Year | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   | 24   | 25   | 26   | 27   | 28   | 29   | 30   | 31   | 32   | 33   | 34   | 35   | 36   | 37   | 38   | 39   | 40   | 41   | 42   | 43   | 44   | 45   | 46   | 47   | 48   | 49   | 50   | 51   | 52   | 53   | 54   | 55   | 56   | 57   | 58   | 59   | 60   | 61   | 62   | 63   | 64   | 65   | 66   | 67   | 68   | 69   | 70   | 71   | 72   | 73   | 74   | 75   | 76   | 77   | 78   | 79   | 80   | 81   | 82   | 83   | 84   | 85   | 86   | 87   | 88   | 89   | 90   | 91   | 92   | 93   | 94   | 95   | 96   | 97   | 98   | 99   | 100  |      |      |      |      |      |      |      |      |      |      |      |      |

[illegible]

7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

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This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1970-1978. Soil names and descriptions were approved in 1978. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1978. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Pope County Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

*Cover: Coastal bermudagrass on Linker fine sandy loam, 3 to 8 percent slopes. Pastureland provides forage for the livestock that contributes heavily to the economy of Pope County.*



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# foreword

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This soil survey contains information that can be used in land-planning programs in Pope County, Arkansas. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

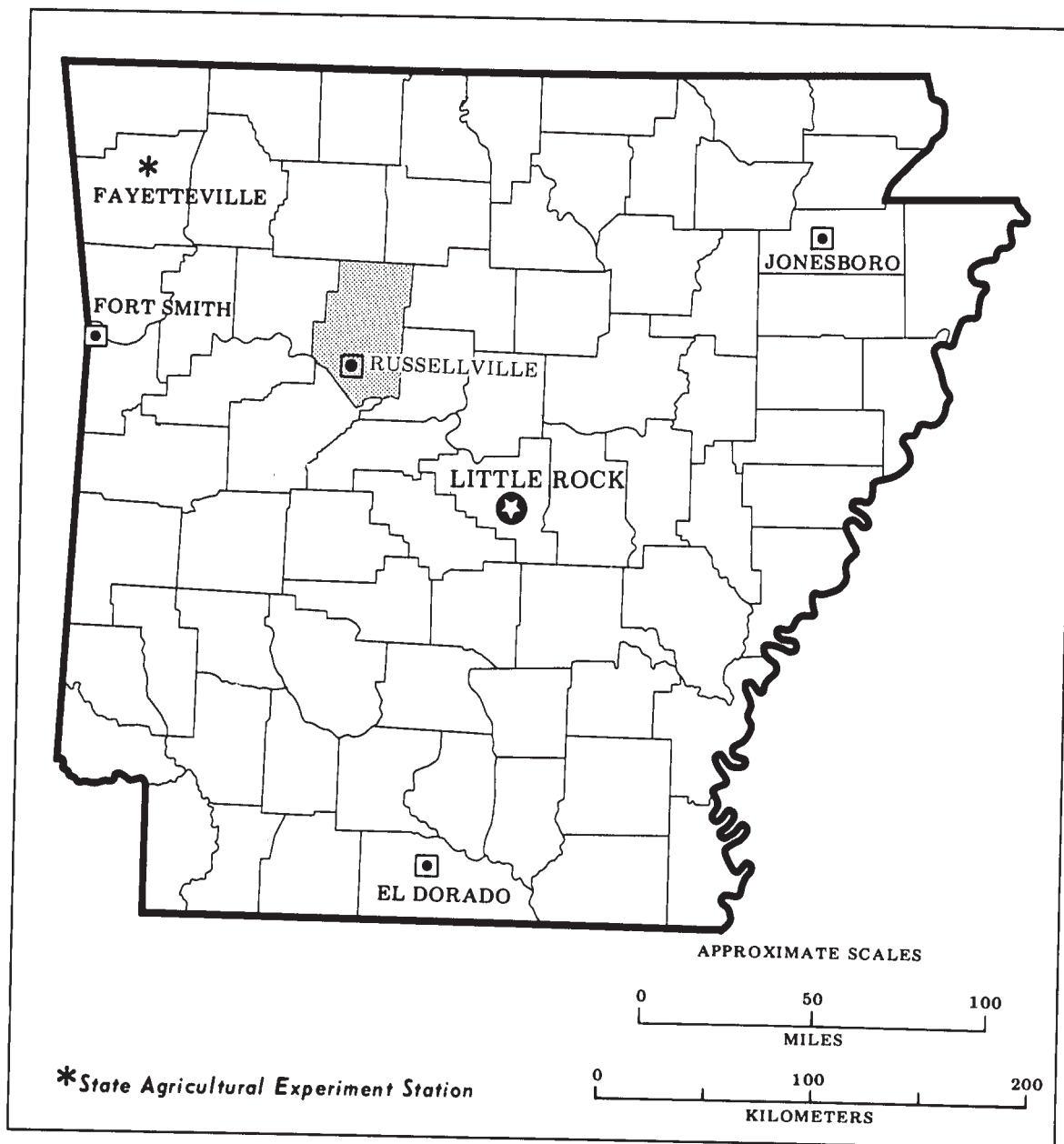
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

A handwritten signature in black ink, reading "M J Spears". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

M. J. Spears  
State Conservationist  
Soil Conservation Service



*Location of Pope County in Arkansas.*



# soil survey of Pope County, Arkansas

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By Frank M. Vodrazka and Alex L. Winfrey, Soil Conservation Service  
and Tom H. Arnold, Jimmy M. Gass, and Emmanuel Hudson, Forest Service

United States Department of Agriculture  
Soil Conservation Service and Forest Service  
in cooperation with the  
Arkansas Agricultural Experiment Station

POPE COUNTY is in west-central Arkansas. The county is bounded on the north by Newton and Searcy Counties, on the east by Van Buren and Conway Counties, on the south by Yell and Logan Counties, and on the west by Johnson County, Arkansas. It is irregular in shape, ranges from about 16 to 25 miles in width, and is about 42 miles in length. The total area of the county is 822 square miles, or 526,080 acres, according to the 1974 Census of Agriculture. The land area is 519,810 acres, or 812 square miles, which includes 1,085 acres of water in bodies less than 40 acres and streams less than one-eighth of a mile in width.

In 1970, the population was 28,607. Russellville, the county seat, had a population of 13,909. Most of the people in the county, including more than half of the farmers, work in industries or supporting businesses in the Russellville area.

About 19,200 acres, or 4 percent, of the soil survey area was used for crops and about 133,100 acres, or 26 percent, was used for pasture and hayland in 1978 according to an unpublished inventory by the Soil Conservation Service. The potential of the soils is good for increased production of food in Pope County. A large acreage of potentially good cropland is used as woodland or pasture. In addition, food production can be increased by the use of the latest crop production technology. This soil survey can greatly facilitate in applying such technology.

Acreage in crops and pasture has gradually been decreasing as more and more land is used for urban development. In 1976, an estimated 24,000 acres was used for urban and built-up land in the county. The use of this soil survey to help make land use decisions is discussed in the section "General soil map units."

Except for those soils on the Arkansas River flood plain, the soils in Pope County are generally low in nitrogen, potassium, phosphorus, calcium, and organic matter. Many of the soils suitable for cultivation are subject to the hazard of erosion. Poor surface drainage or internal drainage and the susceptibility to flooding are limitations in places. Many soils are poorly suited to crops and pasture because of stony conditions, shallow depth to bedrock, high content of coarse fragments within the surface layer, or combinations of these features.

This survey supersedes the soil survey of Pope County that was published in 1915 (4).

## general nature of the county

This section discusses farming, physiography, and climate in Pope County.

About 60 percent of the county is mountainous and hilly. These areas are scattered throughout the county, and the elevation ranges from about 450 feet at the base of the hills and mountains to 2,128 feet at the top of Walker Mountain in the Boston Mountains. The soils in most of these areas are too steep for intensive use. The soils are used mainly for woodland and for native pasture. Some of the less sloping soils are suitable for improved pasture, and some of the soils in narrow valleys are suitable for truck crops.

About 40 percent of the county is level to gently sloping hilltops and mountaintops, valley fill, and alluvial sediments. The elevation ranges from about 300 feet in

the southeastern part of the county to about 1,000 feet atop the valley ridges. Except for the intensively farmed soils on bottom lands along the Arkansas River, the soils in the level to gently sloping areas are used mainly for forage crops.

### farming

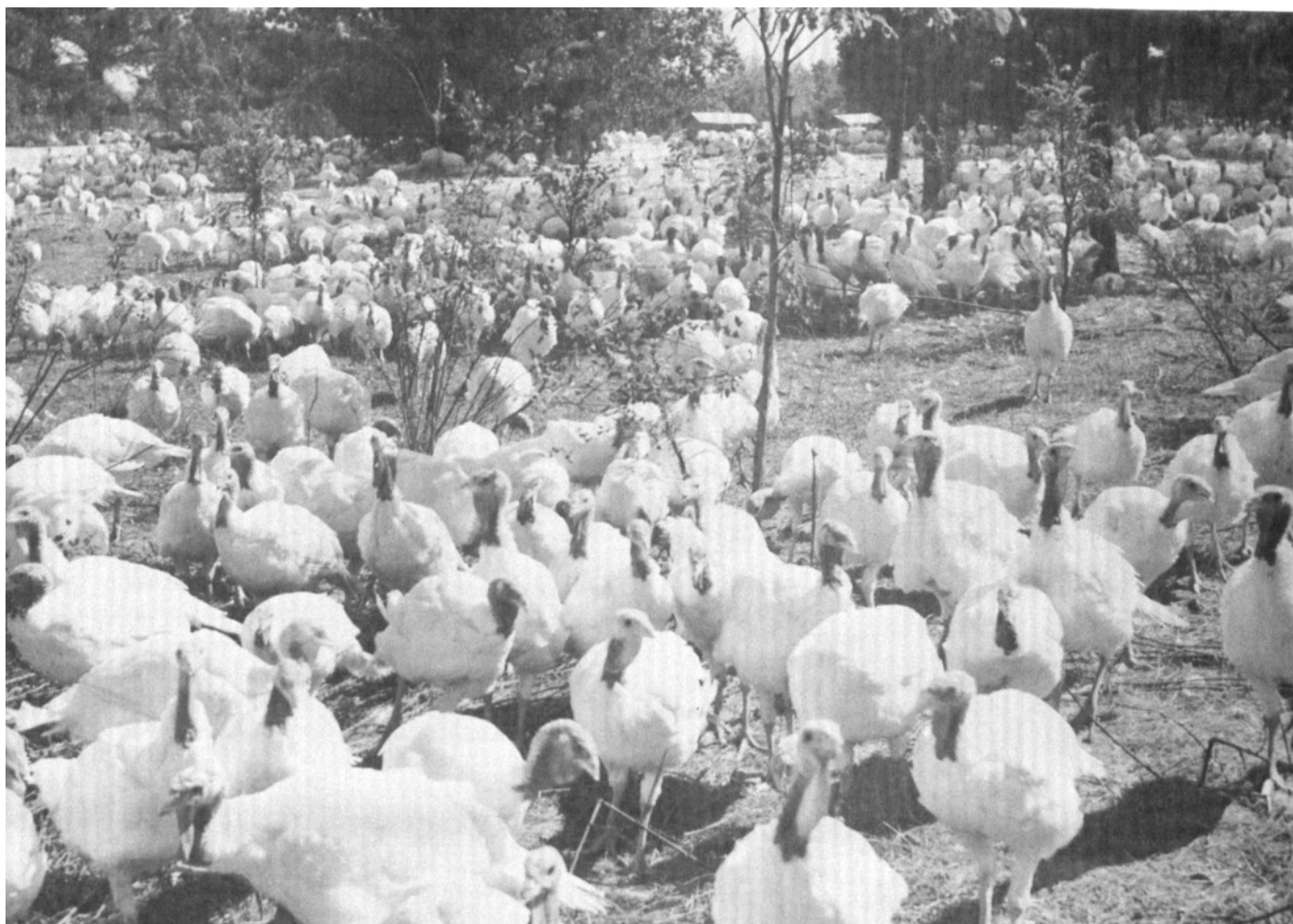
Farming in Pope County began on soils that had good natural drainage. These soils are on high positions near the flood plain of the Arkansas River and on the hills and in the valleys. Cotton was the main cash crop. Most areas of the better drained soils were cleared for farming, and the areas of steep, stony, or wet soils were left in woodland.

More recently, farming has become more diversified and generally less intensive. In the area of ridges and

valleys, dairy herds, beef cattle, hogs, and poultry—turkeys (fig. 1), broiler chickens, and laying hens—provide most of the farm income. Some farms have a small acreage of orchard, vineyard, or vegetables, or a combination.

On the bottom lands along the Arkansas River, flood control, use of improved crop varieties, and improved soil management techniques have led to the expansion of cropland onto nearly all of the flood plain. Most of the soils used for woodland on the bottom land along the river have been cleared, and the natural drainage has been improved for more reliable crop production on the wet soils.

On these bottom land soils, soybeans is the main crop; but grain sorghum, rice, and winter small grains are also grown.



*Figure 1.*—Turkey range of Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes. This moderately rapidly permeable soil is well suited for poultry.



Table 1 shows the acreage of principal crops and pasture grown, and table 2 gives the number of livestock and poultry sold in selected years.

The 1974 Census of Agriculture indicated about 35 percent of the county was farmland. The rest was mainly in cities and built-up areas, transportation facilities, and federal land within the Ozark National Forest.

Farms in Pope County are decreasing in number and increasing in size. Between 1969 and 1974, the number of farms decreased from 934 to 885, and the average size increased from 193 to 208 acres. Of the farm operators in the county in 1974, 686 were full owners, 147 were part-owners, and 52 were tenants. Of these operators, 475 of them worked off the farm for 100 days or more each year.

## physiography

The Arkansas River flows eastward and forms the southern boundary of the county. A relatively narrow flood plain parallels the course of the river. The most fertile soils in the county, those of the Dardanelle, Rilla, and Roxana series, are in this area. The flow of the Arkansas River is regulated by major flood control impoundments upstream and by a series of locks and dams that form a navigable channel. The Arkansas River is navigable to barge traffic all year. The river provides recreation—fishing, boating, and waterfowl hunting.

The Boston Mountains are in the northern part of Pope County. In this area steep, stony mountains rise from the Arkansas Valley. The area is drained by Big Piney Creek and by the North Fork, the Middle Fork, and the East Fork of the Illinois Bayou. The Boston Mountains are capped by sandstone, and the sides are interbedded sandstone and shale. The slopes range from 3 to 65 percent.

The Arkansas Valley, which makes up most of the rest of the county, consists of rolling, flat-topped hills, long narrow ridges, and broad valleys. The hilltops and ridges are capped with hard sandstone. The hillsides and valleys are mostly underlain by shale. The slopes range from 0 to 45 percent. This area is drained by streams that include the Illinois Bayou, Galla Creek, Gum Log Creek, and West Fork Point Remove Creek.

The main soils on the mountains and hills are Mountainburg, Enders, and Nella soils. Linker and Mountainburg soils dominate the ridges. Leadvale and Taft soils dominate the broad valleys. Ground water is insufficient for large scale irrigation. Domestic water is supplied mainly by dug wells and drilled wells; livestock water is supplied mainly by ponds and creeks.

## climate

Prepared by the National Climatic Center, Asheville, N.C.

Pope County is hot in summer, especially at low elevations, and moderately cool in winter, especially on

mountains and high hills. Rainfall is fairly heavy and well distributed throughout the year. Snow falls nearly every winter, but snow cover lasts but a few days.

Table 3 gives data on temperature and precipitation for the survey area as recorded at Russellville, Ark., for the period 1951 to 1977. Table 4 shows probable dates of the first freeze in fall and the last freeze in spring. Table 5 provides data on length of the growing season.

In winter the average temperature is 42 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record, which occurred at Russellville on February 2, 1951, is -14 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 92 degrees. The highest recorded temperature, which occurred on July 13, 1954, is 113 degrees.

Growing degree days as shown in table 3 are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 26 inches, or 54 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 6 inches at Russellville on August 13, 1957. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 3 inches. The greatest snow depth at any one time during the period of record was 8 inches. On the average, seldom is there a day with at least 1 inch of snow on the ground, but the number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 50 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The percentage of possible sunshine is 70 percent in summer and 50 percent in winter. The prevailing wind is from the northeast. Average windspeed is highest, 9 miles per hour, in spring.

## how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for

engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.



# general soil map units

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The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The soils in the survey area vary widely in their suitability for major land uses. Soil suitability ratings are based on the practices commonly used in the survey area to overcome soil limitations. These ratings reflect the ease of overcoming the limitations. They also reflect the problems that will persist even if such practices are used.

Each map unit is rated for *cultivated crops, pasture, woodland, and urban uses*. Cultivated crops are those grown extensively in the county area. Pasture crops are those grown for livestock forage. Woodland refers to areas of native or introduced trees. Urban uses include residential, commercial, and industrial developments.

## soil descriptions

### 1. Nella-Enders-Mountainburg

*Well drained, gently sloping to very steep, deep and shallow, loamy soils that are gravelly or stony; on hills and mountains*

This map unit is mainly in the northern part of the county. These soils formed in loamy and clayey residuum weathered from sandstone and shale. Natural drainageways are mainly fast-flowing, intermittent streams, and there are a few perennial streams.

This unit occupies about 46 percent of the county. It is about 36 percent Nella soils, 28 percent Enders soils, 21 percent Mountainburg soils, and 15 percent minor soils.

Nella soils are on hillsides, mountainsides, foot slopes, and benches. These soils are deep and have a dark

grayish brown gravelly fine sandy loam surface layer and a yellowish red, red, and strong brown gravelly clay loam subsoil. Enders soils are on hillsides and mountainsides. These soils are deep and have a dark brown gravelly or stony fine sandy loam surface layer and a yellowish red and red silty clay and clay subsoil. Mountainburg soils are on the tops of hills and mountains and on ledges and benches. These soils are shallow, have a very dark grayish brown gravelly or stony fine sandy loam surface layer and a strong brown very gravelly fine sandy loam subsoil.

The minor soils in this map unit are the well drained Ceda, Leesburg, Linker, Pickwick, and Spadra soils and the moderately well drained Cane soils. Also included are small areas of water.

This unit is mainly woodland. Steep slopes and erosion hazard are the main limitations. Stones on the surface are a severe limitation in some areas.

This unit is unsuited to cultivated crops and is poorly suited to pasture. The main limitations are steep slopes, a very severe erosion hazard, and gravel and stones on the surface.

This unit is well to poorly suited to woodland. Steep slopes and stones on the surface are the main limitations.

The Nella soils are moderately suited to most urban uses because of slope and are poorly suited where slopes are over 15 percent. Because of the high shrink-swell potential and slopes, the Enders soils are poorly suited to most urban uses. The Mountainburg soils are poorly suited to most urban uses because of depth to rock, slope, and large stones on the surface.

### 2. Mountainburg-Linker

*Well drained, nearly level to moderately steep, shallow and moderately deep, loamy soils, some are gravelly or stony; on hills, mountains, and ridges*

This map unit is throughout the county but mainly in the southern part. The soils formed in loamy residuum weathered from level-bedded sandstone. Natural drainageways are mainly fast-flowing, intermittent streams.

This unit occupies about 35 percent of the county. It is about 53 percent Mountainburg soils, 39 percent Linker soils, and 8 percent minor soils.

Mountainburg soils are on the tops and sides of hills, mountains, and ridges. These soils are shallow and have

a very dark grayish brown gravelly or stony fine sandy loam surface layer and a strong brown very gravelly fine sandy loam subsoil. Linker soils are on the tops of hills and mountains. These soils are moderately deep and have a brown fine sandy loam surface layer and a yellowish red loam and gravelly fine sandy loam subsoil.

The minor soils in this map unit are the well drained Nella, Enders, and Spadra soils and the moderately well drained Leadvale and Cane soils.

This unit is mainly pasture, and there are small areas of woodland. Shallow rooting depth and gravel and stones on the surface are the main limitations.

This unit is moderately suited to unsuitable for cultivated crops and moderately suited to poorly suited to pasture. The main limitations are slopes, depth to bedrock, and gravel and stones on the surface.

This unit is moderately suited to poorly suited to woodland. The main limitations are rooting depth, gravel, and stones on the surface.

Because of depth to bedrock and slope, the Linker soils are moderately suited to most urban uses. Mountainburg soils are poorly suited to most urban uses because of depth to rock and slope.

### 3. Spadra

*Well drained, level and nearly level, deep, loamy soils; on low stream terraces*

This map unit is along the Illinois Bayou, Big Piney Creek, Galla Creek, Gum Log Creek, and West Fork Point Remove Creek. These soils formed from loamy alluvium. Natural drainageways are slow-flowing, intermittent streams and perennial streams.

This unit occupies about 4 percent of the county. It is about 81 percent Spadra soils and 19 percent minor soils. Spadra soils are well drained and have a dark yellowish brown loam surface layer and a reddish brown and brown loam subsoil.

The minor soils in this unit are the well drained Pickwick soils, the moderately well drained Barling, Cane, and Leadvale soils, and the poorly drained Guthrie soils.

This unit is mainly pasture, and there are small areas of cropland. Occasional flooding is the main limitation.

This unit is well suited to cultivated crops, but most areas require erosion control. Occasional flooding is also a limitation.

This unit is well suited to woodland. There are no significant limitations.

This unit is poorly suited to most urban uses. Flooding is the main limitation.

### 4. Muskogee-McKamie-Wrightsville

*Moderately well drained, well drained and poorly drained, level to gently sloping, deep, loamy soils; on terraces adjacent to the Arkansas River flood plain*

This map unit is in the southern part of the county. The soils formed in loamy and clayey alluvium that was

deposited by the Arkansas River. Natural drainageways are slow to fast-flowing intermittent streams.

This unit occupies about 2 percent of the county. It is about 24 percent Muskogee soils, 19 percent McKamie soils, 17 percent Wrightsville soils, and 40 percent minor soils.

Muskogee soils are on intermediate positions between McKamie and Wrightsville soils. Muskogee soils are moderately well drained. The surface layer is brown silt loam, the upper part of the subsoil is yellowish brown silty clay loam, and the lower part of the subsoil is yellowish red silty clay and clay. McKamie soils are on higher positions than Muskogee soils, are well drained, and have a dark brown very fine sandy loam surface and a red silty clay subsoil. Wrightsville soils, on lower positions, are poorly drained and have a very dark grayish brown silt loam surface and a light brownish gray silty clay subsoil.

The minor soils in this unit are the well drained Pickwick soils, the moderately well drained Barling, Cane, and Leadvale soils, the somewhat poorly drained Taft soils, and the poorly drained Guthrie soils.

This unit is mainly pasture, and there are small areas of woodland. The clayey subsoil is the main limitation.

This unit is moderately suited to cultivated crops, but most areas require erosion control measures or drainage.

This unit is well suited to woodland. Seedling mortality caused by the clayey subsoil is a moderate limitation on McKamie and Wrightsville soils.

These soils are poorly suited to most urban uses. Wetness, shrink-swell potential, and slow permeability are the main limitations.

### 5. Leadvale-Taft

*Moderately well drained and somewhat poorly drained, level to gently sloping, deep, loamy soils with fragipans; on old stream terraces in broad valleys*

This map unit is mostly in the southern part of the county. The soils formed in loamy sediment of weathered sandstone and shale washed from local uplands. Natural drainageways are mainly slow-flowing, intermittent streams.

This unit occupies about 9 percent of the county. It is about 62 percent Leadvale soils, 13 percent Taft soils, and 25 percent minor soils.

Leadvale soils are moderately well drained and have a brown silt loam surface layer and a yellowish brown and mottled yellowish brown and strong brown silty clay loam subsoil. Taft soils are somewhat poorly drained and have a dark grayish brown silt loam surface layer and a yellowish brown mottled silt loam and mottled gray and yellowish brown silty clay loam subsoil.

The minor soils in this unit are the moderately well drained Barling, Cane, and Muskogee soils; the well drained Enders, Linker, McKamie, Mountainburg, Pickwick, and Spadra soils; and the poorly drained



Wrightsville soils. Also included are small areas of water and small areas of Udorthents.

This unit is mainly pasture, and there are small areas of hardwood trees along drainageways. Wetness is the main limitation, and the water table is 24 inches below the surface during winter and early spring.

This unit is moderately to well suited to cultivated crops. The erosion hazard and wetness are the main limitations.

This unit is well suited to woodland. Wetness is a moderate limitation on Taft soils.

These soils are moderately suited to poorly suited to most urban uses. Wetness and slow permeability are the main limitations.

## 6. Roxana-Rilla-Dardanelle

*Well drained, level and nearly level, deep, loamy soils; on natural levees on the flood plain of the Arkansas River*

This map unit is in the southern part of the county adjacent to the Arkansas River. These soils formed in loamy alluvium deposited by the Arkansas River. Natural drainageways are mostly slow-flowing intermittent streams.

This unit occupies about 2 percent of the county. It is about 37 percent Roxana soils, 25 percent Rilla soils, 24 percent Dardanelle soils, and 14 percent minor soils.

Roxana soils are on higher positions on natural levees. They have a dark brown silt loam surface layer and a reddish brown silt loam substratum.

Rilla soils are on intermediate positions between Dardanelle and Roxana soils. Rilla soils have a brown silt loam surface layer and a brown, reddish brown, and yellowish red silt loam subsoil.

Dardanelle soils are on lower positions on natural levees. They have a very dark grayish brown silt loam surface layer and a dark reddish brown silt loam and reddish brown silty clay loam subsoil.

The minor soils in this unit are the excessively drained Bruno soils and the poorly drained Roellen soils. Also included are small areas of water.

This unit is well suited to cultivated crops, and this is the main use. Occasional flooding in areas between the levee and the Arkansas River is the main limitation.

This unit is well suited to pasture and woodland. There are no significant limitations.

The Roxana soils are generally well suited to most urban uses. In occasionally flooded areas they are poorly suited. Dardanelle and Rilla soils are moderately suited to most urban uses because of shrink-swell potential and moderate permeability.

## 7. Roellen

*Poorly drained, level, deep, clayey soils; in slack-water areas on the flood plain of the Arkansas River*

This map unit occupies two areas in the southeastern corner of the county. The soils formed in clayey alluvium

deposited by the Arkansas River. Natural drainageways are mainly slow-flowing intermittent streams.

This unit occupies about 1 percent of the county. It is about 80 percent Roellen soils and 20 percent minor soils.

Roellen soils are poorly drained. They have a very dark gray clay surface layer and a dark gray clay subsoil.

The minor soils in this unit are the somewhat poorly drained Moreland soils and the well drained Dardanelle soils. Also included are small areas of water.

This unit is moderately to poorly suited to cultivated crops. It is used mainly as cropland. Wetness is the main limitation; the water table is at or near the surface during the winter and early in spring. Farming operations are delayed several days after a rain because of excess water, and surface drainage is needed.

This unit is well suited to woodland. There are small areas of hardwood trees along the drainageways. Wetness is a severe limitation to the use of equipment.

This unit is poorly suited to most urban uses. Wetness and shrink-swell potential are the main limitations.

## 8. Bruno

*Excessively drained, level to nearly level, deep, sandy soils; on natural levees on the flood plain of the Arkansas River*

This unit is in the southern part of the county adjacent to the Arkansas River. The soils formed in sandy alluvium deposited by the Arkansas River. Natural drainageways are mostly slow-flowing, intermittent streams.

This unit occupies about 1 percent of the county. It is about 86 percent Bruno soils and 14 percent minor soils.

Bruno soils are on the higher flood plain adjacent to the Arkansas River. These soils have a brown loamy fine sand surface layer and a brown and pale brown loamy fine sand and very fine sandy loam substratum.

The minor soils in this unit are the well drained Roxana soils. Also included are small areas of water.

This unit is moderately suited to pasture, and this is the main use. Droughtiness is the main limitation.

This unit is poorly suited to cultivated crops. Droughtiness is the main limitation.

This unit is well suited to woodland. However, limitations include equipment use limitations and seedling mortality caused by droughtiness.

Bruno soils are generally well suited to most urban uses. In occasionally flooded areas they are poorly suited. Poor filtration is the main limitation for septic tank absorption fields.

## broad land use considerations

Deciding which soils should be used for urban development is important in the county. Each year land is developed for urban uses in Russellville, Atkins, and other cities in the county. About 24,000 acres is urban or

built-up land. The general soil map is helpful for planning the outline of urban areas; it cannot, however, be used for the selection of sites for specific urban structures. Generally, soils in the county that are well suited to cultivated crops also are well suited to urban development. The data about specific soils in this survey can be helpful in planning future land use patterns.

Areas where the soils are so unfavorable that urban development is prohibitive are not extensive in the county. However, parts of the Spadra unit, the Roxana-Rilla-Dardanelle unit, the Roellen unit, and Bruno unit are on flood plains in which flooding is a severe limitation for urban development. Also, shrink-swell potential, depth to bedrock, and steep slopes are severe limitations for soils in parts of the Nella-Enders-Mountainburg unit and Mountainburg-Linker unit. Wetness, low strength, and slow permeability are severe limitations for soils in the Leadvale-Taft unit. Shrink-swell potential and slow permeability are severe limitations for soils in the Muskogee-McKamie-Wrightsville unit.

In some areas of the county, the soils are well suited to urban development. These include parts of the

Roxana-Rilla-Dardanelle unit that are protected by levees. These soils also are well suited to farmland.

Some areas in the Roellen unit are well suited to farming but are poorly suited to urban development. Wetness, low strength, and shrink-swell potential are the main limitations for urban development on these soils. With proper engineering design, these limitations can usually be overcome. Many farmers have provided sufficient drainage for growing crops.

Vegetables and other special crops are uniquely suited to parts of the Roxana-Rilla-Dardanelle unit and Spadra unit. These soils are well drained and warm up early in the spring. Nursery plants are also well suited to these soils.

Soils in Pope County are poorly suited to well suited for woodland. Most areas of the Bruno, Roxana-Rilla-Dardanelle unit, Roellen unit, and the Spadra unit are well suited to bottom land hardwood trees. Areas of the Nella-Enders-Mountainburg unit, the Mountainburg-Linker unit, the Muskogee-McKamie-Wrightsville unit, and the Leadvale-Taft unit are poorly suited to moderately suited to pine and upland hardwood trees.



## detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the county. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Linker fine sandy loam, 3 to 8 percent slopes, is one of several phases in the Linker series.

Some map units are made up of two or more major soils. These map units are called soil associations.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Nella-Enders association, steep, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 6 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

### soil descriptions

**1—Barling silt loam, occasionally flooded.** This deep, moderately well drained, level and nearly level soil is on flood plains of local streams. This soil is flooded for very brief periods from December to April, less often than once in 2 years. Slopes are 0 to 2 percent. Individual areas are long and narrow and range from about 50 to 400 acres.

Typically, the surface layer is dark brown silt loam about 5 inches thick. The next layer is brown silt loam to a depth of 12 inches. The subsoil is brown mottled silt loam to 22 inches; mottled grayish brown and brown silt loam to 37 inches; mottled light brownish gray, brown, and strong brown silt loam to 51 inches; and mottled strong brown and light brownish gray silt loam to a depth of 72 inches or more.

This soil is moderate in natural fertility and in organic matter content. The surface layer is slightly acid to strongly acid, and the subsoil is slightly acid to very strongly acid. Permeability is moderate, and the available water capacity is high. The water table is within 12 inches of the surface during winter and early in spring. Crops on this soil respond well to fertilizer. This soil is easy to till and can be cultivated within a wide range of moisture content.

Included with this soil in mapping are small areas of Guthrie, Leadvale, and Spadra soils. The poorly drained Guthrie soils are in level depressional areas, the moderately well drained Leadvale soils are on higher positions than Barling soils, and the well drained Spadra soils are on the same positions but are nearer the stream.

This Barling soil is well suited to cultivated crops including soybeans, truck crops, grain sorghum, and small grains. A large acreage is used for soybeans. Erosion is a slight to moderate hazard. With management that includes winter cover crops, clean-tilled crops that leave large amounts of residue on the surface can be safely grown year after year.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, annual lespedeza, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to southern red oak, sweetgum, eastern cottonwood, green ash, loblolly pine, and shortleaf pine. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Occasional flooding is a severe limitation for dwellings, small commercial buildings, and septic tank absorption fields. Flooding and wetness are severe limitations for local roads and streets. These limitations can be overcome only by major flood control and drainage measures.

This Barling soil is in capability unit 1lw-1 and in woodland suitability group 2o7.

## **2—Bruno loamy fine sand, 0 to 3 percent slopes.**

This deep, excessively drained, level to nearly level soil is on natural levees on the protected areas of the flood plain of the Arkansas River. Levees protect the soil from being flooded. Individual areas range from about 20 to 500 acres.

Typically, the surface layer is brown loamy fine sand about 6 inches thick. The underlying layers are stratified

brown and pale brown loamy fine sand and very fine sandy loam extending to a depth of 72 inches or more.

This soil is low in natural fertility and in organic matter content. The soil is medium acid to mildly alkaline throughout. Permeability is rapid, and the available water capacity is low. Plants on this soil respond poorly to fertilizer, but tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Dardanelle, Rilla, and Roxana soils. These soils are on older natural levees.

This Bruno soil is poorly suited to cultivated crops (fig. 2). Droughtiness is a severe limitation during the summer months. Wind erosion is a severe hazard in the spring if the soil is bare. Suitable crops, however, include soybeans and small grains.

This soil is moderately suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, and weeping lovegrass.

This soil is well suited to eastern cottonwood and American sycamore. Management concerns include equipment use limitations and seedling mortality caused by droughtiness.

This soil is well suited to most urban uses. There are no significant limitations for dwellings, small commercial buildings, and local roads and streets. Poor filtration is a severe limitation for septic tank absorption fields.



Figure 2.—Late soybeans on Bruno loamy fine sand, 0 to 3 percent slopes. This soil is droughty and poorly suited to soybeans.



This Bruno soil is in capability unit IIIs-1 and in woodland suitability group 2s5.

### 3—Bruno loamy fine sand, occasionally flooded.

This deep, excessively drained, level to nearly level soil is on natural levees on flood plains of the Arkansas River. These areas are not protected by a levee and are flooded less often than once every 2 years between December and June. Slopes are 0 to 3 percent. Individual areas range from about 20 to 500 acres.

Typically, the surface layer is brown loamy fine sand about 6 inches thick. The underlying material is stratified brown and pale brown loamy fine sand and very fine sandy loam extending to a depth of 72 inches or more.

This soil is low in natural fertility and in organic matter content. The soil is medium acid to mildly alkaline throughout. Permeability is rapid, and available water capacity is low. Plants on this soil respond poorly to fertilizer, but tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Rilla and Roxana soils. These soils are on older natural levees.

This Bruno soil is poorly suited to cultivated crops. Droughtiness is a severe limitation.

This soil is moderately suited to pasture and is used mainly as pasture. Suited pasture plants include bahiagrass, bermudagrass, and weeping lovegrass.

This soil is well suited to eastern cottonwood and American sycamore. Management concerns include equipment use limitations and seedling mortality caused by droughtiness.

This soil is poorly suited to most urban uses. There is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields because of flooding. This limitation can be overcome only by major flood control measures.

This Bruno soil is in capability unit IIIs-1 and in woodland suitability group 2s5.

**4—Cane loam, 3 to 8 percent slopes.** This deep, moderately well drained, gently sloping soil is on colluvial foot slopes and on old stream terraces in broad valleys. Individual areas range from about 10 to 300 acres.

Typically, the surface layer is dark brown loam about 4 inches thick. The next layer is brown loam to a depth of 9 inches. The subsoil is yellowish red, friable loam to 24 inches; a mottled yellowish red, yellowish brown, and light brownish gray fragipan of clay loam to 48 inches; a mottled yellowish red, yellowish brown, and gray fragipan of clay loam to 64 inches; and mottled yellowish red, yellowish brown, and gray silty clay loam to a depth of 76 inches or more.

This soil is low in natural fertility and in organic matter content. The surface layer is medium acid or strongly acid, and the subsoil is strongly acid or very strongly acid. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is medium.

The compact and brittle fragipan in the subsoil restricts root penetration and slows the movement of water through the soil. The water table is within 24 inches of the surface during winter and early in spring. Crops and grasses on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Enders, Leadvale, and Pickwick soils. The well drained Enders soils are on higher positions than Cane soils. The Leadvale and Pickwick soils are on similar positions. Also included are a few small areas that have less than 3 percent slope and a few small areas that have up to 12 percent slope.

This Cane soil is moderately suited to cultivated crops. Runoff is rapid, and erosion is a severe hazard. With use of contour cultivation and terraces, clean-tilled crops that leave a large amount of residue on the surface can be grown year after year. Conservation methods need to be intensified as slope increases. Suitable crops include soybeans, truck crops, grain sorghum, and small grains.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness is a moderate limitation for dwellings and small commercial buildings and low strength is a moderate limitation for local roads and streets. Slope is also a moderate limitation for small commercial buildings. These limitations can be overcome by proper engineering design. Slow permeability and wetness are severe limitations for septic tank absorption fields, and these limitations are difficult to overcome.

This Cane soil is in capability unit IIIe-1 and woodland suitability group 3o7.

**5—Dardanelle silt loam, 0 to 1 percent slopes.** This deep, well drained, level soil is on natural levees along the Arkansas River. Levees protect the soil from being flooded. Individual areas range from about 50 to 400 acres.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The next layer is very dark brown silt loam to a depth of about 23 inches. The subsoil is dark reddish brown silt loam to 28 inches and reddish brown silty clay loam to 51 inches. The underlying material is brown very fine sandy loam and silt loam to a depth of 91 inches or more.

The soil is high in natural fertility and medium in organic matter content. The surface layer and subsoil are medium acid to neutral, and the underlying material is medium acid to mildly alkaline. Permeability is



moderate, and available water capacity is high. Crops on this soil respond well to fertilizer, and tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Moreland, Rilla, Roxana, and Roellen soils. The Rilla and Roxana soils are on slightly higher positions than Dardanelle. The somewhat poorly drained Moreland soils and the poorly drained Roellen soils are in the lower slack-water areas. Also included are a few small areas of soil with dark colored surface layers less than 20 inches thick.

This Dardanelle soil is well suited to cultivated crops, and this is the main use. The principal crop is soybeans. Other suitable crops include cotton, grain sorghum, small grains, truck crops, and alfalfa.

This soil is well suited for pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, sweetgum, American sycamore, and black walnut. There are no significant limitations for woodland use or management.

This soil is moderately suited to most urban uses. Moderate shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. Moderate permeability is a moderate limitation for septic tank absorption fields. These limitations can be overcome by proper engineering design.

This Dardanelle soil is in capability unit I-1 and in woodland suitability group 104.

**6—Dardanelle silt loam, gently undulating.** This deep, well drained soil is on natural levees along the Arkansas River. Levees protect the soil from being flooded. Individual areas range from about 50 to 500 acres. Slopes are 0 to 3 percent.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The next layer is very dark brown silt loam to a depth of about 23 inches. The subsoil is dark reddish brown silt loam to 28 inches and reddish brown silty clay loam to 51 inches. The underlying material is brown very fine sandy loam and silt loam to a depth of 91 inches or more.

The soil is high in natural fertility and medium in organic matter content. The surface layer and subsoil are medium acid to neutral, and the underlying material is medium acid to mildly alkaline. Permeability is moderate, and available water capacity is high. Crops on this soil respond well to fertilizer, and tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Moreland, Rilla, Roxana, and Roellen soils. The Rilla and Roxana soils are on slightly higher positions than Dardanelle soils. The somewhat poorly drained Moreland soils and the poorly drained Roellen soils are in the lower slack-water areas. Also included are a few

small areas of soil with dark colored surface layers less than 20 inches thick.

This Dardanelle soil is well suited to cultivated crops, and this is the main use. The principal crop is soybeans. Other suitable crops include cotton, grain sorghum, small grains, truck crops, and alfalfa.

This soil is well suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, sweetgum, American sycamore, and black walnut. There are no significant limitations for woodland use or management.

This soil is moderately suited to most urban uses. Moderate shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. Moderate permeability is a moderate limitation for septic tank absorption fields. These limitations can be overcome by proper engineering design.

This Dardanelle soil is in capability unit IIe-1 and in woodland suitability group 104.

**7—Enders gravelly fine sandy loam, 3 to 8 percent slopes.** This deep, well drained, very slowly permeable, gently sloping soil is on crests and toe slopes of ridges and hills. Individual areas range from 10 to 100 acres.

Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is ripplable shale bedrock.

This soil is low in natural fertility and in organic matter content. This soil is strongly acid or very strongly acid throughout. Permeability is very slow, and the available water capacity is medium. Crops on this soil respond to fertilizer, and tilth is difficult to maintain.

Included with this soil in mapping are a few small areas of Cane, Leadvale, Linker, Mountainburg, and Nella soils. The moderately well drained Cane and Leadvale soils and the well drained Nella soils are on adjacent colluvial foot slopes. The Linker and Mountainburg soils are on ridgetops. Also included are a few small areas where the surface layer is silt loam.

This Enders soil is poorly suited to cultivated crops. Runoff is rapid, and erosion is a very severe hazard. Under good management sown crops may be grown occasionally in a cropping system that includes a close-growing cover crop most of the time.

This soil is moderately suited to pasture, and this is the main use. Suitable pasture plants include bermudagrass, bahiagrass, tall fescue, annual lespedeza, and sericea lespedeza.



This soil is moderately suited to loblolly pine, shortleaf pine, and southern red oaks. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. High shrink-swell potential is a severe limitation for dwellings, small commercial buildings, and roads and streets. Low strength is also a severe limitation for roads and streets. These limitations can usually be overcome with proper engineering design. Very slow permeability is a severe limitation for septic tank filter fields and is very difficult to overcome.

This Enders soil is in capability unit IVe-1 and in woodland suitability group 4o1.

**8—Enders gravelly fine sandy loam, 8 to 12 percent slopes.** This deep, well drained, very slowly permeable, moderately sloping soil is on crests and toe slopes of ridges and hills. Individual areas range from about 10 to 100 acres.

Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to a depth of about 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is rippable shale bedrock.

This soil is low in natural fertility and organic matter content. This soil is strongly acid or very strongly acid throughout. Permeability is very slow, and the available water capacity is medium.

Included with this soil in mapping are a few small areas of Nella and Mountainburg soils. The deep Nella soils are on adjacent colluvial slopes, and the shallow Mountainburg soils are on ridgetops.

This Enders soil is unsuited for cultivated crops. It is moderately suited to pasture. Runoff is rapid, and erosion is a very severe hazard.

Suitable pasture plants include bermudagrass, bahiagrass, tall fescue, annual lespedeza, and sericea lespedeza. This soil is mainly in pasture and woodland.

This soil is moderately suited to loblolly pine, shortleaf pine, and southern red oaks. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. High shrink-swell potential is a severe limitation for dwellings, small commercial buildings, and local roads and streets. Slope is also a severe limitation for small commercial buildings, and low strength is a severe limitation for local roads and streets. These limitations can usually be overcome with proper engineering design. Very slow permeability is a severe limitation for septic tank filter fields and is very difficult to overcome.

This Enders soil is in capability unit VIe-1 and in woodland suitability group 4o1.

**9—Enders stony fine sandy loam, 12 to 45 percent slopes.** This deep, well drained, very slowly permeable,

moderately steep to steep soil is on side slopes of ridges and hills. Individual areas range from about 10 to 500 acres.

Typically, the surface layer is dark brown stony fine sandy loam about 3 inches thick. The next layer is strong brown stony fine sandy loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly clay to 56 inches. Below this is rippable shale bedrock.

This soil is low in natural fertility and in organic matter content. This soil is strongly acid or very strongly acid throughout the profile. Permeability is very slow, and the available water capacity is medium.

Included with this soil in mapping are a few small areas of Leesburg, Mountainburg, and Nella soils. The deep Leesburg and Nella soils are on adjacent colluvial slopes, and the shallow Mountainburg soils are on ridgetops. Also included are a few areas that have a gravelly silt loam surface layer.

This Enders soil is unsuitable for cultivated crops and is poorly suited to pasture. Rapid runoff, very severe hazard of erosion, and steep slopes are severe limitations. Where pasture is established, plants include bermudagrass, bahiagrass, tall fescue, annual lespedeza, and sericea lespedeza.

This soil is poorly suited to woodland; however, it is used mainly as woodland. Trees to plant include loblolly pine, shortleaf pine, and southern red oak. Management problems include slight to severe erosion hazard and moderate to severe equipment use limitations.

This soil is poorly suited to most urban uses. High shrink-swell potential and steep slopes are severe limitations for dwellings, small commercial buildings, and local roads and streets. Low strength is also a severe limitation for roads and streets. These limitations can usually be overcome by proper engineering design. Very slow permeability and slope are severe limitations for septic tank filter fields and are very difficult to overcome.

This Enders soil is in capability unit VIIs-1 and in woodland suitability group 5r3.

**10—Enders-Mountainburg association, rolling.** This association consists of deep and shallow, well-drained, rolling soils that are on hillsides and mountainsides in a regular and repeating pattern. Slopes are 8 to 20 percent. The Enders soils are on slopes between sandstone ledges and on foot slopes. These soils formed from predominately acid shale bedrock. The Mountainburg soils are on narrow sandstone ledges and benches and developed from acid sandstone bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. The mapped areas of this unit range from about 50 to 700 acres.

The deep Enders soils make up about 50 percent of this map unit. Typically, the surface layer is dark brown



gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is rippable shale bedrock.

Permeability of the Enders soils is very slow, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. These soils are strongly acid or very strongly acid throughout.

The shallow Mountainburg soils make up about 40 percent of this unit. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam that extends to a depth of about 15 inches. Below this is level-bedded acid sandstone bedrock.

Permeability of Mountainburg soils is moderately rapid, and the available water capacity is very low. The natural fertility is low and organic matter content is moderate. These soils are strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of well drained Nella soils on benches and foot slopes. Also included are a few small areas of rock outcrop.

These Enders and Mountainburg soils are unsuitable for cultivated crops. Runoff is rapid, and erosion is a very severe hazard. Surface gravel and stones limit the use of equipment. The Enders soils are poorly suited to pasture, and the Mountainburg soils are unsuitable for pasture.

Most areas of this unit are woodland. The Enders soils are moderately suited to shortleaf pine, loblolly pine, eastern redcedar, and southern red oak. The Mountainburg soils are poorly suited to woodland. Management problems include a moderate erosion hazard and severe equipment use limitation because of stones on the surface.

The soils in this unit are poorly suited to most urban uses. Enders soils have severe limitations for dwellings, small commercial buildings, and road and streets because of high shrink-swell potential. Slope is a severe limitation for small commercial buildings. Low strength is a severe limitation for roads and streets. Slow permeability is a severe limitation for septic tank absorption fields. Mountainburg soils have severe limitations for dwellings, small commercial buildings, roads and streets, and septic tank absorption fields because of depth to rock and large stones. Slope is a severe limitation for small commercial buildings. Limitations for dwellings, small commercial buildings, and local roads and streets can usually be overcome with proper engineering design. Limitations for septic tank absorption fields are difficult to overcome.

These Enders soils are in capability unit VIe-1 and in woodland suitability group 4o1. These Mountainburg soils

are in capability unit VIIs-2 and in woodland suitability group 5x3.

**11—Enders-Mountainburg association, steep.** This association consists of deep and shallow, well drained, steep soils that are on hillsides and mountainsides in a regular and repeating pattern. Slopes range from 20 to 40 percent. The Enders soils are on slopes between sandstone ledges or benches and on foot slopes. These soils formed from predominately acid shale bedrock. The Mountainburg soils are on narrow sandstone ledges and benches and developed from acid sandstone bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. The mapped areas range from about 50 to 1,000 acres.

The deep Enders soils make up about 55 percent of this map unit. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is rippable shale bedrock.

Permeability of Enders soils is very slow, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. These soils are strongly acid or very strongly acid throughout.

The shallow Mountainburg soils make up about 40 percent of the unit. Typically, the surface layer is very dark grayish brown, stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam that extends to a depth of about 15 inches. Below this is level-bedded acid sandstone bedrock.

Permeability of Mountainburg soils is moderately rapid, and the available water capacity is very low. The natural fertility is low and organic matter content is moderate. These soils are strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of Leesburg and Nella soils on benches and foot slopes and Enders soils that have a stony fine sandy loam surface layer. Also included are a few small areas of rock outcrops and a few small areas that have slopes greater than 40 percent.

These Enders and Mountainburg soils are unsuitable for cultivated crops or pasture. The main limitations are steep slopes, surface stones, and droughtiness.

The soils in this unit are poorly suited to woodland, however, this is the main use. Management problems include a severe erosion hazard and severe equipment use limitation because of steep slopes and large stones on the surface.

The soils in this unit are poorly suited to most urban uses. Enders soils have severe limitations for dwellings,



small commercial buildings, and roads and streets because of high shrink-swell potential and slope. Low strength is a severe limitation for roads and streets. Slow permeability and slope are severe limitations for septic tank absorption fields. Mountainburg soils have severe limitations for dwellings, small commercial buildings, roads and streets, and septic tank absorption fields because of depth to rock, large stones, and slope. All of these limitations are difficult to overcome.

These Enders soils are in capability unit VIIe-2 and in woodland suitability group 5r3. These Mountainburg soils are in capability unit VIIs-2 and in woodland suitability group 5x3.

**12—Guthrie silt loam, 0 to 1 percent slopes.** This deep, poorly drained, level soil is on old stream terraces in broad valleys. This soil is flooded on rare occasions. Individual areas range from about 5 to 100 acres.

Typically, the surface layer is dark grayish brown silt loam about 5 inches thick. The subsoil is grayish brown silt loam to a depth of about 13 inches; light brownish gray, mottled friable silt loam to 23 inches; a fragipan from 30 to 60 inches that is gray, mottled silty clay loam to 48 inches and mottled gray, dark yellowish brown, and strong brown silty clay loam to 60 inches; and mottled gray and strong brown silty clay loam to a depth of 74 inches or more.

This soil is low in natural fertility and moderate in organic matter content. Reaction is very strongly acid throughout except for the surface layer in limed areas. Permeability is slow, and available water capacity is medium. The water table is within 6 inches of the surface during winter and early in spring. Crops and grasses on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Barling, Leadvale, and Taft soils. These soils are on higher positions and are better drained than this Guthrie soil. Included are a few small areas that have a few low mounds on the surface. A few areas that are occasionally flooded are included in this unit.

This Guthrie soil is moderately suited to cultivated crops. Suited crops include soybeans and grain sorghum. Winter small grains can be grown where surface drainage is adequate. With use of adequate drainage, clean-tilled crops that leave large amounts of residue on the surface can be grown year after year.

This soil is well suited for pasture, and this is the main use. Suitable pasture plants include bermudagrass, bahiagrass, tall fescue, white clover, annual lespedeza, and sericea lespedeza. Surface drainage is usually needed. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to sweetgum and willow oak. Management problems include a severe equipment use limitation and severe seedling mortality caused by wetness. The equipment use limitation can be overcome by logging during the drier seasons. The seedling mortality problem is difficult to overcome.

This soil is poorly suited to most urban uses. Wetness and flooding are severe limitations for dwellings and small commercial buildings. Wetness and low strength are severe limitations for local roads and streets. Slow permeability and wetness are severe limitations for septic tank absorption fields. All of these limitations are difficult to overcome.

This Guthrie soil is in capability unit IVw-1 and in woodland suitability group 2w9.

**13—Leadvale silt loam, 1 to 3 percent slopes.** This deep, moderately well drained, nearly level soil is on old stream terraces in broad valleys. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is yellowish brown, friable silt loam to a depth of about 14 inches; yellowish brown, friable silty clay loam to 24 inches; mottled strong brown and yellowish brown fragipan of silty clay loam to 56 inches; and strong brown, mottled, firm, silty clay loam to a depth of about 72 inches or more.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is medium. The compact and brittle fragipan in the subsoil restricts root penetration and slows the movement of water through the soil. The water table is within 24 inches of the surface during winter and early in spring. Crops and grasses on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Barling, Cane, Guthrie, Pickwick, and Taft soils. The Barling soils are on flood plains of local streams. The Cane soils are on similar positions. The poorly drained Guthrie and somewhat poorly drained Taft soils are on level positions and in depressional areas. The Pickwick soils are on higher positions. Also included are a few small areas that have a few low mounds on the surface, and a few small areas that have slopes of less than 1 percent.

This soil is well suited for cultivated crops. Erosion is a moderate hazard. With use of contour cultivation and terraces on long slopes, clean-tilled crops that leave a large amount of residue on the surface can be grown year after year. Suitable crops include soybeans, truck crops, grain sorghum, and small grains.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine, and southern red oak. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness is a moderate limitation for dwellings (fig. 3),



small commercial buildings, and local roads and streets. Low strength and wetness are moderate limitations for local roads and streets. These limitations can be overcome by proper engineering design. Wetness and slow permeability are severe limitations for septic tank absorption fields, and these limitations are difficult to overcome.

This Leadvale soil is in capability 1Ie-1 and in woodland suitability group 3o7.

**14—Leadvale silt loam, 3 to 8 percent slopes.** This deep, moderately well drained, gently sloping soil is on colluvial foot slopes of hills and on old stream terraces in broad valleys. Individual areas range from about 10 to 300 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is yellowish brown, friable silt loam to a depth of about 14 inches; yellowish brown, friable silty clay loam to about 24 inches; mottled strong brown and yellowish brown fragipan of silty clay loam to 56 inches; and strong brown, mottled firm silty clay loam to 72 inches or more.

This soil is low in natural fertility and in organic matter content. The soil is strongly acid or very strongly acid throughout. Permeability is moderate above the fragipan and slow in the fragipan. Available water capacity is medium. The compact and brittle fragipan in the subsoil

restricts root penetration and slows the movement of water through the soil. The water table is within 24 inches of the surface during winter and early in spring. Crops and grasses on this soil respond well to fertilizer, and till is easy to maintain.

Included with this soil in mapping are a few small areas of Cane and Enders soils. The Cane soils are in similar positions to this Leadvale soil, and the Enders soils are on higher positions.

This Leadvale soil is moderately suited to cultivated crops. Erosion is a severe hazard. With use of contour cultivation and terraces, clean-tilled crops that leave large amounts of residue can be safely grown year after year. Conservation treatment needs to be intensified as slope increases. Suitable crops include soybeans, truck crops, grain sorghum, and small grains.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass (fig. 4), tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine, and southern red oak. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Wetness is a moderate limitation for dwellings. Wetness



Figure 3.—Leadvale silt loam, 1 to 3 percent slopes is moderately suited to housing developments if septic tank filter field systems are not used for sewage disposal.



Figure 4.—Common bermudagrass pasture on Leadvale silt loam, 3 to 8 percent slopes. This soil is well suited to pasture and is moderately suited to ponds.

and slope are moderate limitations for small commercial buildings. Low strength and wetness are moderate limitations for local roads and streets. However, these limitations can be overcome by proper engineering design. Wetness and slow permeability are severe limitations for septic tank absorption fields and are difficult to overcome.

This Leadvale soil is in capability unit IIIe-1 and in woodland suitability group 3o7.

**15—Leesburg-Enders association, steep.** This association consists of deep, well drained soils that are on steep hillsides and mountainsides in a regular and repeating pattern. Slopes are 20 to 40 percent. The Leesburg soils are on foot slopes and benches. These soils formed in loamy colluvium from acid sandstone and shale. The Enders soils are on side slopes and benches. These soils developed from acid shale bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. The mapped areas are mostly long and narrow and are from about 50 to 400 acres.

The Leesburg soils make up about 50 percent of this unit. Typically, the surface layer is dark brown gravelly loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 24 inches and strong brown gravelly clay loam to 72 inches or more.

Leesburg soils have moderate permeability, and the

available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

The Enders soils make up about 35 percent of the unit. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is rippable shale bedrock.

Enders soils have very slow permeability, and the available water capacity is medium. The natural fertility and organic matter content are low. Reaction is strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of the well drained Nella soils, a few small areas of the shallow Mountainburg soils, and a few small areas of rock outcrop.

The Leesburg and Enders soils are unsuitable for cultivated crops or pasture. The main limitation is the slope. The hazard of erosion is very severe.

The soils in this unit are mainly woodland. The Leesburg soils are well suited for shortleaf pine, loblolly pine, and northern red oak. These soils have a severe erosion hazard and a severe equipment use limitation because of slope. The Enders soils are poorly suited to woodland. Suitable trees are shortleaf pine and loblolly



pine. These soils have a slight to severe erosion hazard and a severe equipment use limitation because of slope.

These soils are poorly suited to most urban uses. The Leesburg soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets because of slope. The Enders soils have severe limitations for dwellings, small commercial buildings, and local roads and streets because of slope and shrink-swell potential. Low strength is a severe limitation for local roads and streets. Slow permeability and slope are severe limitations for septic tank absorption fields. All of these limitations are difficult to overcome.

These Leesburg soils are in capability unit VIIe-1 and in woodland suitability group 3r9. These Enders soils are in capability unit VIIe-2 and in woodland suitability group 5r3.

#### **16—Linker fine sandy loam, 1 to 3 percent slopes.**

This moderately deep, well drained, nearly level soil is on hilltops and mountaintops. Individual areas range from about 10 to 80 acres.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is yellowish red loam to a depth of 25 inches and yellowish red, mottled gravelly fine sandy loam to 35 inches. Below this is level-bedded acid sandstone.

This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is low. Crops and grasses on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Mountainburg soils. The shallow Mountainburg soils are in similar positions to this Linker soil. Also included are a few small areas of soils that have a gravelly surface layer and a few small areas of soils in which depth to sandstone bedrock is more than 40 inches.

This Linker soil is moderately suited to cultivated crops. Erosion is a moderate hazard. With use of contour cultivation and terraces, clean-tilled crops that leave a large amount of residue on the surface can be safely grown year after year. Suitable crops include soybeans, grain sorghum, winter small grains, truck crops, apples, peaches, and grapes.

This soil is moderately suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is moderately suited to loblolly pine, shortleaf pine, and eastern redcedar. There are no significant limitations for woodland use or management.

This soil is moderately suited for most urban uses. Depth to rock is a moderate limitation for dwellings, local

roads and streets, and small commercial buildings. Depth to rock is a severe limitation for septic tank absorption fields. With proper engineering design, limitations can be easily overcome for all uses except septic tank absorption fields.

This Linker soil is in capability unit IIe-1 and in woodland suitability group 4o1.

#### **17—Linker fine sandy loam, 3 to 8 percent slopes.**

This moderately deep, well drained, gently sloping soil is on hilltops and mountaintops. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is yellowish red loam to a depth of about 25 inches and is yellowish red, mottled gravelly fine sandy loam to a depth of about 35 inches. Below this is level-bedded acid sandstone bedrock.

This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is low. Crops and grasses on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Enders, Mountainburg, and Nella soils. The deep Enders and Nella soils are on the sides of the hills, mountains, and ridges. The shallow Mountainburg soils are on similar positions to this Linker soil. Also included are a few small areas of soils that have gravelly surface layer and a few small areas in which depth to sandstone bedrock is more than 40 inches.

This Linker soil is moderately suited to cultivated crops. Erosion is a severe hazard. With use of contour cultivation and terraces, clean-tilled crops that have a large amount of residue on the surface can be safely grown year after year. Conservation treatments need to be intensified as slope increases. Suited crops include soybeans, grain sorghum, winter small grains, truck crops, apples, peaches, and grapes.

This soil is moderately suited to pasture, and this is the main use (fig. 5). Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is moderately suited to loblolly pine, shortleaf, and eastern redcedar. There are no significant limitations for woodland use or management.

This soil is moderately suited to most urban uses. Depth to bedrock is a moderate limitation for dwellings and local roads and streets. Depth to bedrock and slopes are moderate limitations for small commercial buildings. Depth to bedrock is a severe limitation for septic tank absorption fields. With proper engineering design, limitations can be easily overcome for all uses except septic tank absorption fields.

This Linker soil is in capability unit IIIe-1 and in woodland suitability group 4o1.





Figure 5.—Weeping lovegrass hay harvested on Linker fine sandy loam, 3 to 8 percent slopes.

**18—Linker fine sandy loam, 8 to 12 percent slopes.** This moderately deep, well drained, moderately sloping soil is on hilltops and mountaintops. Individual areas range from about 10 to 100 acres.

Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is yellowish red loam to a depth of about 25 inches and yellowish red, mottled gravelly fine sandy loam to a depth of about 35 inches. Below this is level-bedded acid sandstone bedrock.

This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is low. Crops and grasses on this soil respond well to fertilizer, and tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Enders, Mountainburg, and Nella soils. The deep Enders and Nella soils are on the sides of hills, mountains, and ridges. The shallow Mountainburg soils are on similar positions to this Linker soil. Also included are a few small areas of soils that have a gravelly surface layer and a few small areas in which the depth to sandstone bedrock is more than 40 inches.

This Linker soil is poorly suited to cultivated crops. The hazard of erosion is very severe. Sown crops can be grown in a cropping system that includes a close-growing cover crop most of the year.

This soil is moderately suited to pasture, and this is

the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is moderately suited to growing loblolly pine, shortleaf pine, and northern red oak. There are no significant limitations for woodland use or management.

This soil is poorly suited to most urban uses. Depth to bedrock and slopes are moderate limitations for dwellings and local roads and streets. Slope is a severe limitation for small commercial buildings. Depth to bedrock is a severe limitation for septic tank absorption fields. All these limitations are difficult to overcome.

This Linker soil is in capability unit IVe-2 and in woodland suitability group 4o1.

**19—Linker-Mountainburg association, gently rolling.** This association consists of well drained, moderately deep and shallow, gently rolling soils on hilltops and mountaintops in a regular and repeating pattern. Slopes range from 1 to 8 percent. The shallow Mountainburg soils are near the rims of hilltops and mountaintops, and the Linker soils are in the areas where depth to bedrock is greater. Both of these soils developed from acid sandstone bedrock. The individual



soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. Individual areas range from 50 to 200 acres.

The well drained, moderately deep Linker soils make up about 60 percent of the unit. Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is yellowish red loam to a depth of about 25 inches and yellowish red, mottled gravelly fine sandy loam to 35 inches. Below this is level-bedded acid sandstone bedrock.

Linker soils are low in natural fertility and moderate in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is low. Crops and grasses on this soil respond well to fertilizer, and tilth is easy to maintain.

The well drained, shallow Mountainburg soils make up about 30 percent of the unit. Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 2 inches thick. The next layer is brown gravelly fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam to 15 inches. Below this is level-bedded acid sandstone bedrock.

Mountainburg soils are low in natural fertility and moderate in organic matter content. Reaction is medium acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is very low. Crops on this soil respond poorly to fertilizer.

Included with these soils in mapping are a few small areas of Enders and Nella soils. These deep soils are on side slopes. Also included are a few small areas that have a stony surface and a few small areas of rock outcrop.

Linker soils are moderately suited for cultivated crops. Erosion is a severe hazard. With use of contour cultivation and terraces, clean-tilled crops that leave a large amount of residue on the surface can be safely grown year after year. Conservation treatments need to be intensified as slope increases. Suitable crops include soybeans, grain sorghum, winter small grains, truck crops, apples, peaches, and grapes.

This soil is moderately suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

Mountainburg soils are poorly suited to cultivated crops. Erosion is a very severe hazard, and gravel in the surface layer limits the use of equipment.

This soil is poorly suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

Most areas of this unit are woodland. The Linker soils are moderately suited to shortleaf pine, loblolly pine, and

eastern redcedar. There are no significant limitations for woodland use or management.

The Mountainburg soils are poorly suited to woodland. However, trees to plant include pine and eastern redcedar. Management problems include moderate seedling mortality because of the very low available water capacity.

Linker soils are moderately suited to most urban uses. Depth to bedrock is a moderate limitation for dwellings and local roads and streets. Depth to bedrock and slopes are moderate limitations for small commercial buildings. Depth to bedrock is a severe limitation for septic tank absorption fields. With proper engineering design, limitations can be easily overcome for all uses except septic tank absorption fields.

Mountainburg soils are poorly suited to most urban uses. Depth to bedrock is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. This limitation is costly or impractical to overcome.

These Linker soils are in capability unit IIIe-1 and in woodland suitability group 4o1. These Mountainburg soils are in capability unit IVe-3 and in woodland suitability group 5d2.

**20—Linker-Mountainburg association, rolling.** This association consists of well drained, moderately deep and shallow, moderately rolling soils on hilltops and mountaintops in a regular and repeating pattern. Slopes range from 8 to 20 percent. The shallow Mountainburg soils are near the rims of hilltops and mountaintops and the Linker soils are in areas where depth to bedrock is greater. Both of these soils developed from acid sandstone bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. Individual areas range from 50 to 200 acres.

The moderately deep Linker soils make up about 60 percent of the unit. Typically, the surface layer is brown fine sandy loam about 5 inches thick. The subsoil is yellowish red loam to a depth of about 25 inches and yellowish red, mottled gravelly fine sandy loam to 35 inches. Below this is level-bedded acid sandstone bedrock.

Linker soils are low in natural fertility and moderate in organic matter content. Reaction is strongly acid or very strongly throughout. Permeability is moderate, and available water capacity is low.

The shallow Mountainburg soils make up about 30 percent of the unit. Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 2 inches thick. The next layer is brown very gravelly fine sandy loam to a depth of about 6 inches. The subsoil is strong brown gravelly loam to 15 inches. Below this is level-bedded acid sandstone bedrock.

This soil is low in natural fertility and moderate in organic matter content. Reaction is medium to very



strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is very low.

Included with these soils in mapping are a few small areas of Enders and Nella soils. The deep Enders soils are on side slopes. The deep Nella soils are on side slopes, foot slopes and benches. Also included are a few small areas that have a stony surface and a few small areas of rock outcrop.

These Linker and Mountainburg soils are unsuitable for cultivated crops. Runoff is rapid, and the erosion is a very severe hazard.

Linker soils are moderately suited to pasture and Mountainburg soils are poorly suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

Most areas of this unit are woodland. The Linker soils are moderately suited to shortleaf pine, loblolly pine, and northern red oak and have no significant management problems. The Mountainburg soils are poorly suited to woodland. Suitable trees are shortleaf pine and eastern redcedar. Management problems include a moderate erosion hazard and a moderate seedling mortality because of the very low available water capacity.

Linker soils are moderately to poorly suited to most urban uses. Depth to bedrock and slope are severe limitations for dwellings and local roads and streets. Slope is a severe limitation for small commercial buildings. Depth to bedrock is a severe limitation for septic tank absorption fields. With proper engineering design, these limitations can be overcome for all uses except septic tank absorption fields. Overcoming this limitation is difficult. The Mountainburg soils are poorly suited to most urban uses. Depth to bedrock and slopes are the main limitations.

These Linker soils are in capability unit Vle-2 and in woodland suitability group 4c1. These Mountainburg soils are in capability unit Vlle-3 and in woodland suitability group 5d2.

**21—McKamie very fine sandy loam, 3 to 8 percent slopes.** This deep well drained, gently sloping soil is on high terraces along the Arkansas River. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is dark brown very fine sandy loam about 2 inches thick. The next layer is brown very fine sandy loam to a depth of about 4 inches. The subsoil is red silty clay to 42 inches. Below this is mottled yellowish red and red clay loam to 56 inches and mottled strong brown and red silty clay loam to 72 inches.

This soil is moderate in natural fertility and low in organic matter content. Reaction ranges from slightly acid to strongly acid in the A horizon and from medium acid to very strongly acid in the upper part of the B

horizon. Below 30 inches, the reaction ranges from very strongly acid to moderately alkaline, and the soil is calcareous in places. Permeability is very slow, and the available water capacity is high. Crops and grasses on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Muskogee and Pickwick soils. Muskogee soils are in slightly lower positions and are moderately well drained. Pickwick soils are on higher positions and are well drained. Also included are a few small areas that have slopes greater than 8 percent and have eroded surface layers.

This soil is poorly suited to cultivated crops. Erosion is a very severe hazard. Sown crops can be safely grown occasionally in a cropping system that includes a close-growing cover crop most of the time.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, annual lespedeza, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to shortleaf pine and loblolly pine. Management problems include moderate equipment use limitations and moderate seedling mortality because of the clayey subsoil.

This soil is poorly suited to most urban uses. Shrink-swell potential is a severe limitation for dwellings, small commercial buildings and local roads and streets. Low strength is also a severe limitation for local roads and streets. These limitations can be overcome by proper engineering design. Slow permeability is a severe limitation for septic tank absorption fields; it is difficult to overcome this limitation.

This McKamie soil is in capability unit IVe-1 and in woodland suitability group 3c2.

**22—Moreland clay, 0 to 1 percent slopes.** This deep, somewhat poorly drained, level soil is in slack-water areas on the flood plain of the Arkansas River. Individual areas range from about 20 to 200 acres.

Typically, the surface layer is dark reddish brown silty clay about 20 inches thick. The subsoil is dark reddish brown silty clay to a depth of about 31 inches, reddish brown silty clay to 46 inches, and reddish brown silty clay loam that extends to about 72 inches or more.

This soil is high in natural fertility and high in organic matter content. The surface layer ranges from slightly acid to mildly alkaline. The subsoil ranges from neutral to moderately alkaline and is calcareous in some places between 10 and 40 inches. Permeability is very slow, and available water capacity is high. The water table is at or near the surface during the winter and early in spring. Crops respond well to fertilizer.

Included with this soil in mapping are a few small areas of Dardanelle and Roellen soils. Dardanelle soils are on higher positions than this Moreland soil and are well drained. Roellen soils are in similar positions and are poorly drained. Also included are a few small areas



that have gently undulating topography and a few small areas that flood occasionally during the winter.

This soil is moderately suited to cultivated crops if surface drainage is adequate. The main crop is soybeans. Other suitable crops include cotton, grain sorghum, and rice. Farming operations are often delayed several days after a rain because of excess water, and surface drainage is needed in some areas.

This soil is well suited to pasture. Suitable pasture plants include bermudagrass and tall fescue. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood and American sycamore. Management problems include severe equipment use limitations because of wetness and moderate seedling mortality because of the high clay content of the soil. The equipment use limitation can be overcome by logging during the drier season.

This soil is poorly suited to most urban uses. Wetness and shrink-swell potential are severe limitations for dwellings and small commercial buildings. Shrink-swell potential, wetness, and low strength are severe limitations for local roads and streets. These limitations usually can be overcome by proper engineering design. Slow permeability and wetness are severe limitations for septic tank absorption fields and are difficult or impractical to overcome.

This Moreland soil is in capability unit IIIw-1 and in woodland suitability group 2w6.

**23—Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes.** This shallow, well drained, gently sloping soil is on hilltops, mountaintops, and ridges. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 2 inches thick. The subsurface layer is brown gravelly fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam to about 15 inches. Below this is level-bedded acid sandstone bedrock.

This soil is low in natural fertility and in organic matter content. Reaction is medium acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is very low. Crops on this soil respond poorly to fertilizer.

Included with this soil in mapping are a few small areas of Enders and Linker soils. The deep Enders soils are on side slopes. The moderately deep Linker soils are on positions similar to this Mountainburg soil. Also included are a few small areas that have a stony surface and a few small areas of rock outcrop.

This soil is poorly suited to cultivated crops. Erosion is a very severe hazard, and gravel in the surface layer limits the use of equipment.

This soil is poorly suited to pasture, but this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, and sericea lespedeza. Management

includes proper stocking, controlled grazing, and weed and brush control.

This soil is poorly suited to shortleaf pine and eastern redcedar. Management problems include moderate seedling mortality because of droughtiness.

This soil is poorly suited to most urban uses. Depth to bedrock is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. This limitation is costly or impractical to overcome.

This Mountainburg soil is in capability unit IVe-3 and in woodland suitability group 5d2.

**24—Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes.** This shallow, well drained, moderately sloping soil is on side slopes and tops of hills, mountains, and ridges. Individual areas range from about 10 to 150 acres.

Typically, the surface layer is very dark grayish brown gravelly fine sandy loam about 2 inches thick. The subsurface layer is brown gravelly fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam to 15 inches. Below this is level-bedded acid sandstone.

This soil is low in natural fertility and in organic matter content. Reaction is medium acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is very low. Grasses on this soil respond poorly to fertilizer.

Included with this soil in mapping are a few small areas of Enders, Linker, and Nella soils. The deep Enders soils are on side slopes. The moderately deep Linker soils are on positions similar to this Mountainburg soil. The deep Nella soils are on side slopes, foot slopes, and benches. Also included are a few small areas that have a stony surface and a few small areas of rock outcrop.

This soil is unsuitable for cultivated crops. This soil is poorly suited to pasture, but this is the main use. Where pasture is established, plants include bahiagrass, bermudagrass, and sericea lespedeza. This soil is very droughty, and erosion is a very severe hazard. Gravel on the surface makes preparing a seedbed difficult.

This soil is poorly suited to woodland. Shortleaf pine and eastern redcedar, however, are suitable trees. Management problems include moderate seedling mortality because of droughtiness.

This soil is poorly suited to most urban uses. Depth to bedrock is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Slope is an additional severe limitation for small commercial buildings. The limitations are costly or impractical to overcome.

This Mountainburg soil is in capability unit VIe-3 and in woodland suitability group 5d2.

**25—Mountainburg stony fine sandy loam, 1 to 12 percent slopes.** This shallow, well drained, nearly level



to moderately sloping soil is on side slopes and tops of hills, mountains, and ridges. Individual areas range from about 10 to 300 acres.

Typically, the surface layer is very dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam to about 15 inches. Below this is level-bedded acid sandstone bedrock.

This soil is low in natural fertility and moderate in organic matter content. Reaction is medium acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is very low.

Included with this soil in mapping are a few small areas of Enders, Linker, and Nella soils. The deep Enders soils are on side slopes. The moderately deep Linker soils are on positions similar to the Mountainburg soils. The deep Nella soils are on side slopes, foot slopes, and benches. Also included are a few small areas that have a gravelly surface and a few small areas of rock outcrop.

This soil is unsuitable for cultivated crops or pasture. The soil is very droughty, and erosion is a very severe hazard. Surface stones limit the use of equipment.

This soil is poorly suited to woodland. However, trees to plant include shortleaf pine and eastern redcedar. Most areas have a scattered cover of blackjack oak, post oak and redcedar. Management problems include severe equipment use limitations and moderate seedling mortality because of surface stones and droughtiness.

This soil is poorly suited to most urban uses. Depth to bedrock and large stones are severe limitations for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Where slopes are greater than 8 percent, there is an additional severe limitation for small commercial buildings. All of these limitations are costly or impractical to overcome.

This Mountainburg soil is in capability unit VIs-1 and in woodland suitability group 5x3.

**26—Mountainburg stony fine sandy loam, 12 to 40 percent slopes.** This shallow, well drained, moderately steep and steep soil is on side slopes and tops of hills, mountains, and ridges. Individual areas range from about 10 to 400 acres.

Typically, the surface layer is very dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam to about 15 inches. Below this is level-bedded acid sandstone bedrock.

This soil is low in natural fertility and moderate in organic matter content. Reaction is medium acid to very strongly acid in the surface layer and strongly acid or very strongly acid in the subsoil. Permeability is moderately rapid, and the available water capacity is very low.

Included with this soil in mapping are a few small areas of Enders and Nella soils. The deep Enders soils are on side slopes and the deep Nella soils are on side slopes, foot slopes, and benches. Also included are a few small areas that have a gravelly surface and a few small areas of rock outcrop.

This soil is unsuitable for cultivated crops and pasture. The soil is very droughty, and erosion is a very severe hazard. Surface stones and steep slopes limit the use of equipment.

This soil is poorly suited to shortleaf pine and eastern redcedar. Most areas have a scattered cover of blackjack oak, post oak, and redcedar. Management problems include severe equipment use limitations and moderate seedling mortality because of the surface stones, steep slopes, and droughtiness.

This soil is poorly suited to most urban uses. Depth to bedrock, slopes, and large stones are severe limitations for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. All of these limitations are costly or impractical to overcome.

This Mountainburg soil is in capability unit VIIs-2 and in woodland suitability group 5x3.

**27—Muskogee silt loam, 1 to 3 percent slopes.** This deep, moderately well drained, nearly level soil is on high terraces along the Arkansas River. Individual areas range from about 10 to 100 acres.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsurface layer is yellowish brown silt loam about 6 inches thick. The subsoil is yellowish brown silty clay loam to a depth of about 15 inches; yellowish brown mottled silty clay loam to 25 inches; yellowish red, mottled silty clay to 45 inches; and yellowish red clay to 72 inches or more.

This soil is moderate in natural fertility and low in organic matter content. Reaction ranges from medium acid to very strongly acid in the surface and upper part of the subsoil. The lower subsoil is strongly acid through mildly alkaline and in some pedons calcareous. Permeability is slow, and the available water capacity is high. The water table is within 12 inches of the surface during winter and early in spring. Crops on this soil respond well to fertilizer, and tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Leadvale, McKamie, and Wrightsville soils. The moderately well drained Leadvale soils on slightly higher positions are farther away from the river than this Muskogee soil. The well drained McKamie soils on slightly higher positions are nearer the river. The poorly drained Wrightsville soils in slightly lower positions are farther away from the river.

This Muskogee soil is well suited to cultivated crops. Erosion is a moderate hazard. With use of contour cultivation and terraces on long slopes, clean-tilled crops that leave large amounts of residue on the surface can be safely grown year after year. Suitable crops include soybeans, truck crops, grain sorghum, and small grains.



This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Shrink-swell potential and wetness are severe limitations for dwellings and small commercial buildings. Low strength and shrink-swell potential are severe limitations for local roads and streets. These limitations can usually be overcome by proper engineering design. Slow permeability and wetness are severe limitations for septic tank absorption fields and are difficult to overcome.

This Muskogee soil is in capability unit IIe-1 and in woodland suitability group 3o7.

**28—Muskogee silt loam, 3 to 8 percent slopes.** This deep, moderately well drained, gently sloping soil is on high terraces along the Arkansas River. Individual areas range from about 50 to 200 acres.

Typically, the surface layer is dark brown silt loam about 4 inches thick. The subsurface layer is yellowish brown silt loam about 6 inches thick. The subsoil is yellowish brown silty clay loam to a depth of about 15 inches; yellowish brown, mottled silty clay loam to 25 inches; yellowish red, mottled silty clay to 45 inches; and yellowish red clay to 72 inches or more.

This soil is moderate in natural fertility and low in organic matter content. Reaction ranges from medium acid to very strongly acid in the surface layer and upper part of the subsoil. The lower part of the subsoil is strongly acid through mildly alkaline and in some pedons calcareous. Permeability is slow, and the available water capacity is high. The water table is within 12 inches of the surface during winter and early in spring. Crops on this soil respond well to fertilizer, and till is easy to maintain.

Included with this soil in mapping are a few small areas of Leadvale and McKamie soils. The moderately well drained Leadvale soils on slightly higher positions are farther from the river. The well drained McKamie soils on slightly higher positions are nearer the river.

This soil is moderately suited to cultivated crops. Erosion is a severe hazard. With use of contour cultivation and terraces, clean-tilled crops that leave large amounts of residue on the surface can be safely grown year after year. Conservation treatment needs to be intensified as slope increases. Suitable crops include soybeans, truck crops, grain sorghum, and small grains.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes

proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine, and sweetgum. There are no significant limitations for woodland use and management.

This soil is poorly suited to most urban uses. Shrink-swell potential and wetness are severe limitations for dwellings and small commercial buildings. Low strength and shrink-swell potential are severe limitations for local roads and streets. These limitations can usually be overcome with proper engineering design. Slow permeability and wetness are severe limitations for septic tank absorption fields and are difficult to overcome.

This Muskogee soil is in capability unit IIIe-1 and in woodland suitability group 3o7.

**29—Nella gravelly fine sandy loam, 3 to 8 percent slopes.** This deep, well drained, gently sloping soil is on foot slopes and benches of hills and mountains. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red, and strong brown clay loam to 72 inches or more.

This soil is low in natural fertility and organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium. Crops and grasses on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Enders, Linker, and Mountainburg soils. The Enders soils are on similar positions, and the Linker and Mountainburg soils are on tops of hills, mountains, and ridges and on edges of benches on side slopes. Also included are a few small areas that have a fine sandy loam surface.

This Nella soil is moderately suited to cultivated crops. Erosion is a severe hazard, and the gravel in the surface layer limits the use of equipment. With use of contour cultivation and terraces, clean-tilled crops that leave a large amount of residue on the surface can be safely grown year after year. Conservation treatments need to be intensified as slope increases. Suitable crops include grain sorghum, winter small grains, truck crops, apples, peaches, and grapes.

This soil is moderately suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to woodland. Suitable trees include loblolly pine, shortleaf pine, and northern red oak. There are no significant limitations for woodland use and management.



This soil is well suited to most urban uses. Slope is a moderate limitation for small commercial buildings. Moderate permeability is a moderate limitation for septic tank absorption fields. This limitation can be easily overcome by proper engineering design.

This Nella soil is in capability unit IIIe-1 and in woodland suitability group 3o7.

**30—Nella gravelly fine sandy loam, 8 to 12 percent slopes.** This deep, well drained, moderately sloping soil is on foot slopes and benches of hills and mountains. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red, and strong brown clay loam to 72 inches or more.

This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate and available water capacity is medium. Grasses on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Enders, Linker, and Mountainburg soils. The Enders soils are in similar positions and the Linker and Mountainburg soils are on tops of hills, mountains, and ridges and on edges of benches on side slopes. Also included are a few small areas that have a fine sandy loam surface.

This soil is poorly suited to cultivated crops. Erosion is a very severe hazard, and the gravel in the surface layer limits the use of equipment. Under good management sown crops can be in a cropping system that includes a close-growing cover crop most of the time.

This soil is moderately suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited for woodland. Suitable trees include loblolly pine, shortleaf pine, and northern red oak. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Slope is a moderate limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. Moderate permeability is an additional moderate limitation for septic tank absorption fields. These limitations can be easily overcome by proper engineering design.

This Nella soil is in capability unit IVe-2 and in woodland suitability group 3o7.

**31—Nella gravelly fine sandy loam, 12 to 20 percent slopes.** This deep, well drained, moderately

steep soil is on side slopes, foot slopes and benches of hills and mountains. Individual areas range from about 10 to 500 acres.

Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red, and strong brown clay loam to 72 inches or more.

This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is moderate, and available water capacity is medium. Grasses on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Enders and Mountainburg soils. The Enders soils are in similar positions, and the Mountainburg soils are on tops of hills, mountains, and ridges and on edges of benches on side slopes. Also included are a few small areas that have a fine sandy loam surface and a few small areas that have slopes greater than 20 percent.

This soil is unsuitable for cultivated crops. Runoff is rapid, and erosion is a very severe hazard. Surface gravel and stones limit the use of equipment.

This soil is moderately suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited for woodland. Suitable trees include loblolly pine, shortleaf pine, and northern red oak. There are no significant limitations for woodland use and management.

This soil is poorly suited for most urban uses. Slope is a severe limitation for dwellings, local roads and streets, and septic tank absorption fields. These limitations can be overcome by proper engineering design.

This Nella soil is in capability unit VIe-2 and in woodland suitability group 3o7.

**32—Nella-Enders association, rolling.** This map unit consists of deep, well drained soils that are on rolling hillsides and mountainsides in a regular and repeating pattern. Slopes are 8 to 20 percent. The Nella soils are on foot slopes and benches. These soils formed in loamy colluvium from acid sandstone and shale. The Enders soils are on side slopes and benches. These soils developed from acid shale bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. Mapped areas are mostly long and narrow and range from about 50 to 600 acres.

The Nella soils make up about 50 percent of this unit. Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The



subsoil is strong brown gravelly loam to 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red, and strong brown clay loam to 72 inches or more.

The Nella soils have moderate permeability and medium available water capacity. The natural fertility is low and organic matter content is moderate. These soils are strongly acid or very strongly acid throughout.

Enders soils make up about 40 percent of this unit. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is soft shale bedrock.

Permeability of the Enders soils is very slow, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. These soils are strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of moderately deep Linker soils and shallow Mountainburg soils. These soils are on ridgetops. Also included in mapping are a few small areas of rock outcrops.

These Nella and Enders soils are unsuitable for cultivated crops. Runoff is rapid, and the hazard of erosion is very severe. Gravel in the surface layer limits the use of equipment.

These soils are moderately suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

Most areas of this unit are woodland. The Nella soils are well suited to shortleaf pine, loblolly pine, and northern red oak, and the soils have no significant woodland management problems. The Enders soils are moderately suited to shortleaf pine and loblolly pine, and these soils have no significant management problems.

These Nella and Enders soils are moderately to poorly suited to most urban uses. On the Nella soils, slope is a moderate limitation for dwellings, local roads and streets, and septic tank absorption fields. Moderate permeability is also a moderate limitation for septic tank absorption fields. Slope is a severe limitation for small commercial buildings. On the Enders soils, shrinking and swelling of the soils is a severe limitation for dwellings, small commercial buildings, and local roads and streets. Low strength is a severe limitation for local roads and streets. Slope is a severe limitation for small commercial buildings. These limitations can usually be overcome by proper engineering design. Limitations for septic tank absorption fields are difficult to overcome.

These Nella soils are in capability unit Vle-2 and in woodland suitability group 3o7. These Enders soils are in capability unit Vle-1 and in woodland suitability group 4o1.

**33—Nella-Enders association, steep.** This map unit consists of deep, well drained soils that are on steep hillsides and mountainsides in a regular and repeating pattern. Slopes are 20 to 40 percent. The Nella soils are on foot slopes and benches. These soils formed in loamy colluvium from acid sandstone and shale. The Enders soils are on side slopes and benches. These soils developed from acid shale bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. The mapped areas are mostly long and narrow and are from about 50 to 1,000 acres.

The Nella soils make up about 50 percent of this unit. Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red, and strong brown clay loam to 72 inches or more.

Nella soils have moderate permeability, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

The Enders soils make up about 40 percent of this unit. Typically, the surface layer is dark brown gravelly fine sandy loam about 3 inches thick. The next layer is strong brown gravelly loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is soft shale bedrock.

Enders soils have very slow permeability, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of the shallow Mountainburg soils, a few small areas of the deep Leesburg soils, and a few small areas of rock outcrop.

These Nella and Enders soils are unsuitable for cultivated crops and pasture. The main limitation is the slope. Erosion is a very severe hazard.

The soils in this unit are mainly woodland. The Nella soils are well suited to shortleaf pine, loblolly pine, and northern red oak. Management problems include a severe erosion hazard and equipment use limitation because of slope. The Enders soils are poorly suited to woodland. Suitable trees are shortleaf pine and loblolly pine. Management problems include a severe erosion hazard and an equipment use limitation because of the slopes.

These Nella and Enders soils are poorly suited to most urban uses. The Nella soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets.



because of slope. The Enders soils have severe limitations for dwellings, small commercial buildings, and local roads and streets because of slope and shrinking and swelling of soils. Low strength is also a severe limitation for local roads and streets. Slope and slow permeability are severe limitations for septic tank absorption fields. All of these limitations are difficult to overcome.

These Nella soils are in capability unit VIIe-1 and in woodland suitability group 3r9. These Enders soils are in capability unit VIIe-2 and in woodland suitability group 5r3.

**34—Nella-Enders-Mountainburg association, very steep.** This map unit consists of deep and shallow, well drained soils that are on very steep hillsides and mountainsides in a regular and repeating pattern. Slopes range from 40 to 65 percent. The Nella soils are on foot slopes and benches. These soils formed in loamy colluvium from acid sandstone and shale bedrock. The Enders soils are on side slopes and benches. These soils developed from acid shale bedrock. The Mountainburg soils are on narrow sandstone ledges, ridgetops, and benches. These soils developed from acid sandstone bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. Mapped areas are mostly long and narrow and range from 50 to 1,000 acres.

The deep Nella soils make up about 45 percent of the unit. Typically, the surface layer is dark grayish brown stony fine sandy loam about 3 inches thick. The next layer is brown stony fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red, and strong brown clay loam to 72 inches or more.

Permeability of Nella soils is moderate, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

The deep Enders soils make up about 30 percent of the unit. Typically, the surface layer is dark brown stony fine sandy loam about 3 inches thick. The next layer is strong brown stony loam to a depth of about 7 inches. The subsoil is yellowish red silty clay to a depth of about 18 inches; red clay to 28 inches; red, mottled clay to 36 inches; mottled red and gray clay to 48 inches; and mottled yellowish red and gray shaly silty clay to 56 inches. Below this is soft shale bedrock.

Permeability of Enders soils is very slow, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

The shallow Mountainburg soils make up about 20 percent of the association. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine

sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam that extends to 15 inches. Below this is level-bedded acid sandstone bedrock.

Permeability of Mountainburg soils is moderately rapid, and the available water capacity is very low. The natural fertility is low and organic matter content is moderate. The soils are strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of the well drained Leesburg soils and a few small areas of rock outcrop.

The soils in this unit are unsuitable for cultivated crops and pasture. The main limitations are steep slopes and surface stones.

Most areas of this unit are mainly woodland. The Nella soils are moderately suited to woodland. Suitable trees include shortleaf pine, loblolly pine, and northern red oak. Management problems include a severe erosion hazard and a severe equipment use limitation because of slope and surface stones. The Enders soils are poorly suited to woodland. Suitable trees include shortleaf pine and loblolly pine. Management problems include a moderate erosion hazard and a severe equipment use limitation because of the slopes and surface stones. Mountainburg soils are poorly suited to woodland. Suitable trees include shortleaf pine and eastern redcedar. Management problems include a severe erosion hazard and a severe equipment use limitation because of slope and surface stones.

This unit is poorly suited to most urban uses. The Nella soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets because of slope. The Enders soils have severe limitations for dwellings, small commercial buildings, and local roads and streets because of shrinking and swelling potential and slope. Slope and slow permeability are severe limitations for septic tank absorption fields. The Mountainburg soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets because of depth to rock, slope, and large stones. These limitations are extremely difficult to overcome.

These Nella soils are in capability unit VIIs-1 and in woodland suitability group 4x9. These Enders soils are in capability unit VIIs-1 and in woodland suitability group 5x3. The Mountainburg soils are in capability unit VIIs-2 and in woodland suitability group 5x3.

**35—Nella-Mountainburg association, rolling.** This association consists of deep and shallow, well drained soils that are on moderately steep hillsides and mountainsides in a regular and repeating pattern. Slopes are 8 to 20 percent. The Nella soils are on foot slopes and benches. These soils formed in loamy colluvium from acid sandstone and shale. The Mountainburg soils are on narrow sandstone ledges, ridgetops and benches.



These soils developed from acid sandstone bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. The mapped areas are mostly long and narrow and are from about 50 to 600 acres.

The deep Nella soils make up about 55 percent of the map unit. Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 17 inches; yellowish red gravelly clay loam to 47 inches; and mottled red, yellowish red and strong brown clay loam to 72 inches or more.

Permeability of Nella soils is moderate, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

The shallow Mountainburg soils make up about 30 percent of the unit. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam that extends to 15 inches. Below this is level-bedded acid sandstone bedrock.

Permeability of Mountainburg soils is moderately rapid, and the available water capacity is very low. The natural fertility is low and organic matter content is moderate. The soils are strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of the well drained Enders soils formed in clayey material that has weathered from shale. Also included are a few small areas of rock outcrop.

These Nella and Mountaintop soils are unsuitable for cultivated crops. Runoff is rapid, and the hazard of erosion is very severe. Surface gravel and stones limit the use of equipment.

The Nella soils are moderately suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control. The Mountainburg soils are unsuitable for pasture.

Most areas of this unit are woodland. The Nella soils are well suited to shortleaf pine, loblolly pine, and northern red oak, and these soils have no significant management problems. The Mountainburg soils are poorly suited to woodland. Adapted trees include shortleaf pine and eastern redcedar. Management problems include severe equipment use limitation and a moderate erosion hazard because of slope and surface stones. Seedling mortality is caused by droughtiness.

The soils in this unit are poorly suited to most urban uses. The Nella soils have moderate limitations for septic tank absorption fields, dwellings and local streets, and roads because of slope. Moderate permeability is also a moderate limitation for septic tank absorption fields.

Slope is a severe limitation for small commercial buildings. The Mountainburg soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local streets and roads because of large stones and depth to bedrock. Slope is also a severe limitation for small commercial buildings. All of these limitations are extremely difficult to overcome.

These Nella soils are in capability unit VIe-2 and in woodland suitability group 3o7. The Mountainburg soils are in capability unit VIIs-2 and in woodland suitability group 5x3.

**36—Nella-Mountainburg association, steep.** This association consists of deep and shallow, well drained soils that are on steep hillsides and mountains in a regular and repeating pattern. Slopes are 20 to 40 percent. The Nella soils are on foot slopes and benches. They formed in loamy colluvium from acid sandstone and shale. The Mountainburg soils are on narrow sandstone ledges, ridgetops, and benches. They developed from acid sandstone bedrock. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use. The mapped areas are mostly long and narrow and are from about 50 to 1,000 acres.

The deep Nella soils make up about 55 percent of the unit. Typically, the surface layer is dark grayish brown gravelly fine sandy loam about 3 inches thick. The next layer is brown gravelly fine sandy loam about 6 inches thick. The subsoil is strong brown gravelly loam to a depth of about 17 inches; yellowish red gravelly clay loam to a depth of about 47 inches; and mottled red, yellowish red, and strong brown clay loam to a depth of 72 inches or more.

Permeability of Nella soils is moderate, and the available water capacity is medium. The natural fertility is low and organic matter content is moderate. Reaction is strongly acid or very strongly acid throughout.

The shallow Mountainburg soils make up about 30 percent of the unit. Typically, the surface layer is very dark grayish brown stony fine sandy loam about 2 inches thick. The subsurface layer is brown stony fine sandy loam to a depth of about 6 inches. The subsoil is strong brown very gravelly loam that extends to about 15 inches. Below this is level-bedded acid sandstone bedrock.

Permeability of Mountainburg soils is moderately rapid, and the available water capacity is very low. The natural fertility is low and organic matter content is moderate. The soils are strongly acid or very strongly acid throughout.

Included with these soils in mapping are a few small areas of the well drained Enders soils formed in a clayey material that has weathered from shale and a few small areas of the well drained Leesburg soils. Also included are a few small areas of rock outcrop.



The soils in this unit are unsuitable for cultivated crops or pasture. The main limitations are steep slopes and surface stones.

Most areas of this unit are woodland. The Nella soils are well suited to shortleaf pine, loblolly pine, and northern red oak. Management problems include severe erosion hazard and severe equipment use limitation because of slope. The Mountainburg soils are poorly suited to woodland. Suitable trees include shortleaf pine and eastern redcedar. Management problems include severe erosion hazard and severe equipment use limitation because of slopes and surface stones.

The soils in this unit are poorly suited to most urban uses. The Nella soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets because of slope. The Mountainburg soils have severe limitations for septic tank absorption fields, dwellings, small commercial buildings, and local roads and streets because of slope, large stones, and depth to bedrock. All of these limitations are extremely difficult to overcome.

These Nella soils are in capability unit VIIe-1 and in woodland suitability group 3r9. These Mountainburg soils are in capability unit VIIs-2 and in woodland suitability group 5x3.

**37—Pickwick silt loam, 1 to 3 percent slopes.** This deep, well drained, nearly level soil is on stream terraces. Individual areas range from about 10 to 100 acres.

Typically, the surface layer is dark brown silt loam to a depth of about 6 inches. The subsoil is yellowish red silty clay loam to a depth of about 30 inches; red silty clay loam to 48 inches; yellowish red silty clay loam to 59 inches; and red mottled silty clay loam to 72 inches or more.

This soil is low in natural fertility and moderate in organic matter content. Reaction is strongly acid or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and the available water capacity is high. Crops and grasses on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Cane, Leadvale, and Spadra soils. The moderately well drained Cane and Leadvale soils are on similar positions to this Pickwick soil. Spadra soils are in lower positions nearer the streams.

This Pickwick soil is well suited to cultivated crops. Erosion is a moderate hazard. With use of contour cultivation and terraces on long slopes, clean-tilled crops that leave a large amount of residue on the surface can be grown year after year. Suitable crops include soybeans, truck crops, grain sorghum, and small grains.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, white clover, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine and northern red oak. There are no significant limitations for woodland use and management.

This soil is moderately suited to most urban uses. Shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. Moderate permeability is a moderate limitation for septic tank absorption fields. With proper engineering design, this limitation can be easily overcome.

This Pickwick soil is in capability unit IIe-1 and in woodland suitability group 3o7.

**38—Pickwick silt loam, 3 to 8 percent slopes.** This deep, well drained, gently sloping soil is on stream terraces. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is dark brown silt loam to a depth of about 6 inches. The subsoil is yellowish red silty clay loam to 30 inches; red silty clay loam to 48 inches; yellowish red silty clay loam to 59 inches; and red, mottled silty clay loam to 72 inches or more.

This soil is low in natural fertility and moderate in organic matter content. Reaction is strongly or very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and the available water capacity is high. Crops and grasses on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Cane and Leadvale soils. These moderately well drained soils are on similar positions.

This soil is moderately suited to cultivated crops. Erosion is a severe hazard. With use of good management that includes contour cultivation and terraces, clean-tilled crops that leave a large amount of residue can be safely grown year after year. Conservation treatments need to be intensified as slope increases. Suitable crops include grain sorghum, small grains, truck crops, apples, peaches, and grapes.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, sericea lespedeza, and annual lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, shortleaf pine, and northern red oak. There are no significant limitations for woodland use and management.

This soil is moderately suited for most urban uses. Shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. Slope is also a moderate limitation for small commercial buildings. Moderate permeability is a moderate limitation for septic tank absorption fields. With proper engineering design, these limitations can be easily overcome.

This Pickwick soil is in capability unit IIIe-1 and in woodland suitability group 3o7.



**39—Rilla silt loam, 0 to 2 percent slopes.** This deep, well drained, level to nearly level soil is on natural levees along the Arkansas River. Some tracts are gently undulating and have alternating swales and low ridges. Individual areas range from about 40 to 800 acres.

Typically, the surface layer is brown silt loam about 6 inches thick. The subsoil is brown silt loam to a depth of about 29 inches, mottled brown and yellowish red silt loam to 36 inches, mottled reddish brown and yellowish red silt loam to 47 inches, and yellowish red loam to 58 inches. The underlying material is yellowish red mottled loam to 72 inches or more.

This soil is high in natural fertility and low to moderate in organic matter content. The surface layer ranges from slightly acid to strongly acid, and the subsoil is strongly acid or very strongly acid, and the substratum is very strongly acid to moderately alkaline. Permeability is moderate, and available water capacity is high. Crops on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Dardanelle, Moreland, and Roxana soils and a few small areas of soils that have fine sandy loam surfaces. The Dardanelle and Moreland soils are in lower positions than this Rilla soil. The Roxana soils are on higher positions nearer the river.

This Rilla soil is well suited to cultivated crops, and this is the main use. The principal crop is soybeans. Other suitable crops include grain sorghum, cotton, small grains, truck crops, and alfalfa.

This soil is well suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, sweetgum and American sycamore. There are no significant limitations for woodland use or management.

This soil is moderately suited to most urban uses. Shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. Wetness and moderate permeability are moderate limitations for septic tank absorption fields. These limitations can be overcome by proper engineering design.

This Rilla soil is in capability unit 11e-1 and in woodland suitability group 2o4.

**40—Roellen clay, 0 to 1 percent slopes.** This deep, poorly drained, level soil is in slack-water areas on the flood plain of the Arkansas River. This soil is protected from flooding. Individual areas range from about 30 to 1,000 acres.

Typically, the surface layer is very dark gray clay about 11 inches thick. The subsoil is dark gray clay to a depth of about 42 inches. The underlying material is dark gray, mottled clay to 56 inches and reddish brown clay to 80 inches or more.

This soil is high in natural fertility and in organic matter content. The surface layer ranges from medium acid to neutral, and the subsoil and the underlying material range from slightly acid to mildly alkaline. Permeability is slow, and the available water capacity is high. The water table is at or near the surface during the winter and early in spring. Crops on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Dardanelle and Moreland soils. The well drained Dardanelle soils are on higher positions than this Roellen soil. The somewhat poorly drained Moreland soils are in similar positions. Also included are a few small areas that are subject to occasional flooding.

This Roellen soil is moderately suited to cultivated crops and this is the main use. The principal crop is soybeans (fig. 6). Other suitable crops include cotton, grain sorghum, and rice. Farming operations are commonly delayed several days after a rain because of excess water, and surface drainage is needed in some areas.

This soil is well suited to pasture. Suitable pasture plants include bermudagrass and tall fescue. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, water oak, and sweetgum. Wetness, which limits the use of equipment, is a concern of management. This limitation can be overcome by logging during the drier season.

This soil is poorly suited for most urban uses. Wetness and shrink-swell potential are severe limitations for dwellings and small commercial buildings. Wetness, low strength, and shrink-swell potential are severe limitations for local roads and streets. Slow permeability and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This Roellen soil is in capability unit 11lw-1 and in woodland suitability group 2w6.

**41—Roellen clay, occasionally flooded.** This deep, poorly drained, level soil is in slack-water areas on the flood plain of the Arkansas River. This soil is not protected by a levee and is flooded about once every 3 or 4 years between January and May. Slopes are less than 1 percent. Individual areas range from about 30 to 100 acres.

Typically, the surface layer is very dark gray clay about 11 inches thick. The subsoil is dark gray clay about 42 inches thick. The underlying material is dark gray, mottled clay to 56 inches and reddish brown clay to 80 inches or more.

This soil is high in natural fertility and in organic matter content. The surface layer ranges from medium acid to neutral, and the subsoil and underlying material range from slightly acid to mildly alkaline. Permeability is slow, and available water capacity is high. The water table is at or near the surface during winter and early in spring. Crops on this soil respond well to fertilizer.





Figure 6.—Soybeans, in foreground, and a pecan orchard, in background, on Roellen clay, 0 to 1 percent slopes.

Included with this soil in mapping are a few small areas of Moreland soils on similar positions on the landscape. Also included are small low areas that are flooded at least once every 2 years for short periods.

Roellen clay, occasionally flooded, is poorly suited to cultivated crops. The principal crop is soybeans. Other suitable crops are cotton, grain sorghum, and rice. Farming operations are commonly delayed several days after a rain because of excess water, and surface drainage is needed in some areas.

This soil is well suited to pasture. Suitable pasture plants are bermudagrass and tall fescue. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, water oak, and sweetgum. Wetness, which is a limitation to the use of equipment, is a concern of management. This limitation can be overcome by logging during the drier season.

The potential for most urban uses is poor. Flooding, wetness, and shrink-swell potential are severe limitations for dwellings and small commercial buildings. Low strength, wetness, flooding, and shrink-swell potential are severe limitations for local roads and streets. Flooding, slow permeability, and wetness are severe limitations for septic tank absorption fields. These limitations are difficult or impractical to overcome.

This Roellen soil is in capability unit IVw-1 and in woodland suitability group 2w6.

**42—Roxana silt loam, 0 to 1 percent slopes.** This deep, well drained, level soil is on protected areas of the flood plain of the Arkansas River. Levees protect the soil from being flooded. Individual areas range from about 50 to 1,000 acres.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The underlying material is stratified reddish brown silt loam to 72 inches or more.

This soil is high in natural fertility and low in organic matter content. The surface layer ranges from slightly acid to mildly alkaline, and the underlying material ranges from neutral to moderately alkaline. Permeability is moderate, and available water capacity is high. Crops on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Bruno, Dardanelle, and Rilla soils. Bruno soils are on younger natural levees, and Dardanelle and Rilla soils are in slightly lower positions than this Roxana soil.

This Roxana soil is well suited to cultivated crops, and this is the main use. The principal crop is soybeans. Other suitable crops include grain sorghum, cotton, small grains, truck crops (fig. 7), and alfalfa.





Figure 7.—Roxana silt loam, 0 to 1 percent slopes, is well suited to such truck crops as spinach.

This soil is well suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, sweetgum, and American sycamore. There are no significant limitations for woodland use or management.

This soil is well suited to most urban uses. There are only slight limitations for dwellings, small commercial buildings, and local roads and streets. Wetness and moderate permeability are moderate limitations for septic tank absorption fields. These limitations are easy to overcome by proper engineering design.

This Roxana soil is in capability unit I-1 and in woodland suitability 1o4.

**43—Roxana silt loam, occasionally flooded.** This deep, well drained level soil is on the flood plain of the Arkansas River. This soil is not protected by a levee, and it is flooded about once every 3 or 4 years between December and June. Slopes are 0 to 1 percent. Individual areas range from about 40 to 250 acres.

Typically, the surface layer is dark brown silt loam about 6 inches thick. The underlying material is stratified, reddish brown silt loam to a depth of 72 inches or more.

This soil is high in natural fertility and low in organic matter content. The surface layer ranges from slightly acid to mildly alkaline, and the underlying material ranges from neutral to moderately alkaline. Permeability is moderate, and available water capacity is high. Crops

on this soil respond well to fertilizer, and tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Bruno soils that are on younger natural levees. Also included are small low areas that are flooded for short periods at least once every 2 years.

This Roxana soil is well suited to cultivated crops, and this is the main use. The principal crop is soybeans. Other suitable crops include cotton, grain sorghum, small grains, and alfalfa. Winter small grains may be damaged by flooding some years. Erosion is a slight to moderate hazard. With use of winter cover crops, clean-tilled crops that leave large amounts of residue can be safely grown year after year.

This soil is well suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to eastern cottonwood, sweetgum, and American sycamore. There are no significant limitations for woodland use or management.

This soil is poorly suited for most urban uses. Occasional flooding is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. This limitation can be overcome only by major flood control measures.

This Roxana soil is in capability unit IIw-1 and in woodland suitability group 1o4.

**44—Spadra loam, occasionally flooded.** This deep, well drained, level and nearly level soil is on low stream

terraces along the larger upland streams. This soil is flooded about once every 3 or 4 years between December and April. Slopes are 0 to 3 percent. Individual areas range from about 10 to 500 acres.

Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The subsoil is reddish brown loam to a depth of about 14 inches and brown to 53 inches. The underlying material is brown, mottled fine sandy loam to 72 inches or more.

This soil is moderate in natural fertility and in organic matter content. Reaction ranges from medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is high. Crops on this soil respond well to fertilizer, and tillage is easy to maintain.

Included with this soil in mapping are a few small areas of Barling and Ceda soils. The moderately well drained Barling soils are on similar positions but farther from the streams than the Spadra soil. The well drained Ceda soils are in slightly lower positions adjacent to the streams.

This Spadra soil is well suited to cultivated crops. Suitable crops include soybeans, truck crops, and grain sorghum. With use of contour cultivation, clean-tilled crops that have large amounts of residue can be safely grown year after year.

This soil is well suited for pasture, and this is the main use (fig. 8). Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to shortleaf pine, loblolly pine, and southern red oak. There are no significant limitations for woodland use or management.

This soil is poorly suited to most urban uses. Occasional flooding is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. This limitation can be overcome only by major flood control measures.

This Spadra soil is in capability unit 1lw-1 and in woodland suitability group 2o7.



Figure 8.—Coastal bermudagrass on Spadra loam, occasionally flooded. This soil is well suited for pasture.



**45—Spadra-Ceda association, occasionally flooded.** The soils in this association are deep, well drained, and level and nearly level. They occur on flood plains along streams in narrow valleys in a regular and repeating pattern. The individual soils are in areas large enough to be mapped separately, but they were not separated because of poor accessibility and low intensity of use.

The Spadra soils are on low stream terraces, and the Ceda soils are adjacent to the streams. These soils formed in alluvium. These soils are flooded about once every 3 or 4 years between December and April. Slopes are 0 to 3 percent. Individual areas are long and narrow, and range from about 20 to 200 acres.

Spadra soils make up about 55 percent of this association. Typically, the surface layer is dark yellowish brown loam about 6 inches thick. The subsoil is reddish brown loam to a depth of about 14 inches and brown loam to 53 inches. The underlying material is brown, mottled fine sandy loam to 72 inches or more.

These soils are moderate in natural fertility and in organic matter content. Reaction ranges from medium acid to very strongly acid throughout except for the surface layer in limed areas. Permeability is moderate, and available water capacity is medium.

Ceda soils make up about 35 percent of this map unit. Typically, the surface layer is dark brown gravelly fine sandy loam about 4 inches thick. The underlying material is dark yellowish brown and yellowish brown very gravelly fine sandy loam to a depth of 72 inches or more.

These soils are low in natural fertility and in organic matter content. Reaction is slightly acid or medium acid throughout. Permeability is rapid, and available water capacity is low.

Included with these soils in mapping are a few small areas of Pickwick soils and soils that are similar to Ceda but are strongly acid. Pickwick soils are on higher positions.

The Spadra soils are well suited to cultivated crops. The Ceda soils are unsuitable for cultivated crops. The main limitations are gravel in the surface layer and droughtiness.

The Spadra soils are well suited to pasture, and the Ceda soils are moderately suited to pasture. Suitable pasture plants include bahiagrass, bermudagrass, tall fescue, and white clover. Management includes proper stocking, controlled grazing, and weed and brush control.

The soils of this unit are well suited for woodland, and this is the main use. Suitable trees include shortleaf pine, loblolly pine, and southern red oak. There are no significant limitations for woodland use or management.

These soils are poorly suited to most urban uses. Occasional flooding is a severe limitation for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields. This limitation can be overcome only by major flood control measures.

These Spadra soils are in capability unit 1lw-1 and in woodland suitability group 2o7. These Ceda soils are in capability unit VIc-2 and in woodland suitability group 3f8.

**46—Taft silt loam, 0 to 2 percent slopes.** This deep, somewhat poorly drained, level to nearly level soil is on old stream terraces in broad valleys. Individual areas range from about 10 to 200 acres.

Typically, the surface layer is dark grayish brown silt loam about 6 inches thick. The subsurface layer is brown silt loam to a depth of about 11 inches. The subsoil is yellowish brown mottled, friable silt loam to about 19 inches; light brownish gray, mottled, friable silt loam to 25 inches; a fragipan from 25 to 56 inches that is mottled gray and yellowish brown silt loam to 35 inches and mottled gray and yellowish brown silty clay loam to 56 inches; yellowish brown, mottled, firm silty clay loam to 66 inches; and mottled gray and yellowish brown firm silty clay loam to 74 inches or more.

This soil is low in natural fertility and moderate in organic matter content. Reaction is strongly acid or very strongly acid throughout. Permeability is slow, and the available water capacity is medium. The firm, compact, brittle fragipan in the subsoil restricts root penetration and slows the movement of water through the soil. The water table is 12 inches below the surface during winter and early in spring. Crops and grasses on this soil respond well to fertilizer.

Included with this soil in mapping are a few small areas of Cane, Guthrie, and Leadvale soils. Cane and Leadvale soils are on higher positions than the Taft soil. Guthrie soils are on lower positions. Also included are a few small areas that have a few low mounds.

This soil is moderately suited to cultivated crops. Suitable crops include soybeans and grain sorghum. Winter small grains can be grown where surface drainage is adequate. With use of adequate drainage, clean-tilled crops that leave large amounts of residue on the surface can be grown year after year.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants include bermudagrass, bahiagrass, tall fescue, white clover, annual lespedeza, and sericea lespedeza. Surface drainage is needed in some areas. Other management concerns include proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine and sweetgum. Management problems include moderate equipment use limitations and seedling mortality because of wetness. The wetness limitation is usually overcome by logging during the drier seasons and by drainage.

This soil is poorly suited to most urban uses. Wetness is a severe limitation for dwellings and small commercial buildings. Low strength is a severe limitation for local roads and streets. With proper engineering design, these limitations can usually be overcome. Slow permeability and wetness are severe limitations for septic tank



absorption fields. These limitations are difficult or impractical to overcome.

This Taft soil is in capability unit IIIw-2 and in woodland suitability group 3w8.

**47—Udorthents, loamy.** This map unit consists of material remaining from areas that were excavated and stripped of coal (fig. 9). The material forms piles and narrow ridges with moderately steep to steep side slopes. Individual areas range from about 10 to 50 acres.

The material is classified as Udorthents and consists of soils that have been altered, mixed, or obscured by mining operations. This map unit is about 80 percent Udorthents. The soil material ranges from silt loam to very shaly silty clay loam with no definite arrangement into textural layers because of the mixing during mining operations. The content of coarse fragments ranges from about 15 to 90 percent.

Permeability of soils in this map unit is moderate to rapid. The natural fertility and organic matter content are low. The available water capacity is low. These soils range from slightly acid to extremely acid throughout.

Included with these soils in mapping are coal pits, abandoned pits, and a few small areas of Leadvale and Pickwick soils.

This map unit is unsuitable for cultivated crops.

The smoothed areas are moderately suited to pasture and the unsmoothed areas are poorly suited to pasture. Suitable pasture plants include bermudagrass, bahiagrass, tall fescue, annual lespedeza, and sericea lespedeza. Management includes proper stocking, controlled grazing, and weed and brush control.

This map unit is poorly suited to woodland. Seedling mortality, erosion, droughtiness, and slopes on the unsmoothed areas are severe limitations for woodland use and management.



Figure 9.—Typical landscape of Udorthents, loamy.



Udorthents are poorly suited to most urban uses. Areas with slopes less than 15 percent have moderate limitations. Areas with slopes over 15 percent have severe limitations for dwellings, small commercial buildings, local roads and streets, and septic tank absorption fields.

Because this map unit is variable, it is not assigned a capability unit or woodland suitability group.

#### **48—Wrightsville silt loam, 0 to 1 percent slopes.**

This deep, poorly drained, level soil is on terraces along the Arkansas River. Individual areas range from about 20 to 200 acres.

Typically, the surface layer is very dark grayish brown silt loam about 2 inches thick. The subsurface layer is light gray, mottled silt loam to a depth of about 12 inches. The subsoil is light brownish gray, mottled silty clay to 61 inches. The underlying material is mottled light brownish gray and gray silty clay loam to 72 inches or more.

This soil is low in natural fertility and in organic matter content. Reaction is strongly acid or very acid throughout. Permeability is very slow, and available water capacity is high. The water table is 6 inches below the surface during the winter and early in spring. Crops and grasses on this soil respond well to fertilizer, and tilth is easy to maintain.

Included with this soil in mapping are a few small areas of Muskogee and Taft soils. Both of these soils are on higher positions and are better drained than this

Wrightsville soil. Also included are a few small areas that have a few low mounds on the surface.

This Wrightsville soil is moderately suited to cultivated crops. Suitable crops include soybeans and grain sorghum. Winter small grains can be grown where the surface drainage is adequate. With use of adequate drainage, clean-tilled crops that leave large amounts of residue on the surface can be grown year after year.

This soil is well suited to pasture, and this is the main use. Suitable pasture plants are bermudagrass, bahiagrass, tall fescue, white clover, annual lespedeza, and sericea lespedeza. Surface drainage is usually needed. Other management concerns include proper stocking, controlled grazing, and weed and brush control.

This soil is well suited to loblolly pine, sweetgum, and willow oak. Wetness is a management concern. Because of wetness the use of equipment is severely limited and seedling mortality is a moderate hazard. The equipment limitation can be overcome by logging during the drier seasons. The seedling mortality limitation is difficult to overcome.

This soil is poorly suited to most urban uses. Low strength, wetness, and shrink-swell potential are severe limitations for local roads and streets. Shrink-swell potential and wetness are severe limitations for dwellings and small commercial buildings. These limitations can usually be overcome with proper engineering design. Slow permeability and wetness are severe limitations for septic tank absorption fields and are very difficult to overcome.

The Wrightsville soil is in capability unit IIIw-2 and in woodland suitability group 3w9.

## use and management of the soils

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This soil survey is an inventory and evaluation of the soils in the county. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

### crops and pasture

W. Wilson Ferguson, conservation agronomist, Soil Conservation Service, assisted in preparing this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the county, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the

main crops and hay and pasture plants are listed for each soil.

Planners for individual fields or farms should consider the detailed information in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 152,400 acres in the county was used for crops and grassland in 1978 according to an unpublished inventory by the Soil Conservation Service. Of this total, 48,400 acres was used for tame grasses, 84,800 acres was used for native grasses, and 19,200 acres was used for crops, mainly soybeans.

Contour cultivation, terraces, and grassed waterways are needed on sloping soils that are used for clean-tilled crops. Row arrangement and suitable drainage are needed for dependable growth in wet areas.

Annual cover crops of grasses and legumes should be grown regularly in the cropping system if erosion is a severe hazard or if the crops grown leave only a small amount of residue. Crop residue should be left on the soil surface to provide the soil with a protective cover.

A plowpan commonly forms in loamy soils that are improperly tilled or are tilled frequently with heavy equipment. Keeping tillage to a minimum, varying the depth of tillage, and tilling when the content of soil moisture is favorable help prevent formation of a plowpan.

If left bare, the loamy soils tend to crust and pack during periods of heavy rainfall. Growing cover crops and managing crop residue help maintain good tilth.

Soybeans and, to an increasing extent, grain sorghum and rice are the common row crops grown in the county. Wheat and oats are the commonly grown small grain crops.

The amount of fertilizer and lime to be applied should be determined by soil tests and by the kind of crop to be grown.

Coastal bermudagrass, common bermudagrass, and Pensacola bahiagrass are the warm season perennials most commonly grown in the county. Coastal bermudagrass and Pensacola bahiagrass are fairly new to the county, but both are highly satisfactory in production of good quality forage. Tall fescue is the principal cool season perennial grass now grown. Annual lespedeza and white clover are the most commonly grown legumes and are usually grown in combination with grass.



Controlled grazing and proper stocking are essential for producing high quality forage, maintaining the stand, and controlling erosion. These practices help maintain sufficient top growth on the plants to provide for vigorous healthy growth. They also prevent or restrict grazing of tall fescue in summer. Brush control is essential, and weed control is often needed.

Pasture grasses respond well to nitrogen fertilizer, and grass and legume mixtures may require phosphate and potash fertilizers and lime at rates based on soil tests.

More information concerning management of tame and native grasses can be obtained by contacting the office of the Pope County Conservation District.

### **yields per acre**

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 7 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

### **land capability classification**

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other

characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs.

*Capability classes*, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

*Capability subclasses* are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is the hazard of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-1 or IIle-1.



The capability classification of each map unit is given in the section "Detailed soil map units."

## woodland management and productivity

Paul I. Brown, forester, Soil Conservation Service, assisted in preparing this section.

Before clearing for cropland began, Pope County was covered with forest. A 1978 unpublished inventory by the Soil Conservation Service, however, reported that the forest cover was about 343,000 acres, or 66 percent, of the total land area of which about 183,000 acres is located within the Ozark National Forest. Most of the original forest land suitable for conversion to food and forage production has been cleared; the present land use pattern is relatively stable.

Good to poor stands of commercial trees are in the county. Needle-leaved and mixtures of needle-leaved and broad-leaved trees dominate the uplands and the Boston Mountains; broad-leaved trees dominate the bottom land areas.

The value of wood products in Pope County is substantial, although well below its potential. Additionally, the forests of Pope County are valuable for grazing land for domestic livestock, for wildlife habitat, for recreation uses, and for soil and water conservation.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the woodland suitability group symbol for each soil. Soils assigned the same symbol require the same general management and have about the same potential productivity.

The first part of the *woodland suitability group*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant.

The third element in the symbol, a numeral, indicates the kind of trees for which the soils in the group are best suited and also indicates the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and suitability for needle-leaved trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and suitability for broad-leaved trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and suitability for both needle-leaved and broad-leaved trees.

In table 8, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

*Seedling mortality* ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

*Trees to plant* are those that are suited to the soils and to commercial wood production.

## recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil



properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

*Camp areas* require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

*Picnic areas* are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

*Playgrounds* require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

*Paths and trails* for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

## wildlife habitat

Paul M. Brady, biologist, Soil Conservation Service, assisted in preparing this section.

The land and water resources of Pope County in the Arkansas River valley and on the Ozark Mountains provide good habitats for fish, mammals, and birds.

About 66 percent of the county is in forest, mostly in the Ozark National Forest. Forests support varying populations of white-tailed deer, wild turkey, raccoons, coyotes, woodland songbirds, and a few black bears in

the northeastern part of the county. Gray and fox squirrels, gray foxes, bobcats, skunks, and opossums are also present in these forests.

Farmland, concentrated in the Arkansas River valley, is well balanced between cropland and pasture. This farmland supports cottontail rabbit, red foxes, bobwhite quail, mourning doves, striped skunks, and many species of songbirds adapted to field borders and woodland edges.

Some furbearing animals are abundant in Pope County. Muskrats and beavers are rather numerous along streams. According to fur harvest records, raccoons and opossums are the most frequently caught furbearers in the county.

A haven for numerous waterfowl species is the 6,367-acre Holla Bend National Wildlife Refuge in the southeastern part of the county. It also provides good habitat for many game and nongame mammals and especially birds.

Aquatic resources are abundant in the county. An estimated 2,300 farm ponds and several small watershed lakes provide habitat and fishing for largemouth bass, bluegills, redear sunfish, and channel catfish. These species and many more, including spotted bass, white bass, striped bass, crappies, flathead catfish, bowfin, carp, suckers, and gars are in Lake Dardanelle and in the Arkansas River.

The Illinois Bayou and Piney Creek (an important float-fishing and canoeing stream) are a habitat for largemouth, spotted, and smallmouth bass, bluegills and sunfish, channel and flathead catfish, and rock bass.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in Pope County are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind



of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

*Grain and seed crops* are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

*Grasses and legumes* are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, bromegrass, clover, and alfalfa.

*Wild herbaceous plants* are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

*Hardwood trees* and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

*Coniferous plants* furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, cedar, and juniper.

*Wetland plants* are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, cordgrass, rushes, sedges, and reeds.

*Shallow water areas* have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

*Habitat for openland wildlife* consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cottontail, and red fox.

*Habitat for woodland wildlife* consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

*Habitat for wetland wildlife* consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

## engineering

James L. Janski, assistant state conservation engineer, Soil Conservation Service, assisted in preparing this section.

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

*Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations before design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.*

*The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.*

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this



section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

### **building site development**

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

*Shallow excavations* are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves,

utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

*Dwellings and small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

*Local roads and streets* have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

*Lawns and landscaping* require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

### **sanitary facilities**

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if



soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

*Septic tank absorption fields* are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

*Sewage lagoons* are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level

of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

*Sanitary landfills* are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

*Daily cover for landfill* is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

### construction materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal



compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

*Roadfill* is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

*Sand and gravel* are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a *probable* source has a layer of clean sand or gravel or a layer of sand or gravel that is up to

12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an *improbable* source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

*Topsoil* is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

## water management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

*Pond reservoir areas* hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

*Embankments, dikes, and levees* are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

*Drainage* is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic

layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

*Irrigation* is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

*Terraces and diversions* are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

*Grassed waterways* are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.





# soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 20.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

## engineering index properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

*Depth* to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

*Texture* is given in the standard terms used by the U.S. Department of Agriculture (2). These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

*Classification* of the soils is determined according to the Unified soil classification system (6) and the system

adopted by the American Association of State Highway and Transportation Officials (1).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GP, GM, GC, SM, and SC; and silty and clayey soils as ML, CL, MH, and CH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SM-SC.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 20.

*Rock fragments* larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

*Percentage (of soil particles) passing designated sieves* is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

*Liquid limit* and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.



## physical and chemical properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

*Clay* as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

*Moist bulk density* is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

*Permeability* refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

*Available water capacity* refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

*Soil reaction* is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

*Shrink-swell potential* is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

*Erosion factor K* indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

*Erosion factor T* is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition.

In table 17, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.



## soil and water features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

*Hydrologic soil groups* are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

*Flooding*, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable months of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable months for example, November-May, means that flooding can occur during November through May.

The information is based on evidence in the soil

profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

*High water table* (seasonal) is the highest level of a saturated zone in the soil in most years. Only saturated zones within a depth of about 6 feet are indicated. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

*Depth to bedrock* is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

*Risk of corrosion* pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.



For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

### **physical and chemical analyses of selected soils**

The results of physical analysis of several typical pedons in the survey area are given in table 18 and the results of chemical analysis in table 19. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil series and their morphology." The Linker soil sample was analyzed by the Soil Survey Laboratory, Lincoln, Nebr., and the McKamie and Taft soil samples were analyzed by the University of Arkansas, Fayetteville, Ark.

Silt and clay particle size distribution was determined by the hydrometer method (3). Sands were measured by sieving (7).

Organic carbon of the Linker soil sample was determined by a dry combustion method that measures carbon dioxide evolution gravimetrically (7). The percentage of organic matter was then determined by multiplying the percentage of organic carbon by 1.72. Organic matter of the McKamie and Taft soils samples was determined by the modified Walkley-Black method. The organic matter is digested with potassium dichromate-sulfuric acid, and the quantity of chromic acid that is reduced is measured colorimetrically.

Soil pH was determined on 1:1 soil to water mixture.

The bases were extracted with 1*N*, pH 7.0, ammonium acetate. Calcium, potassium, and sodium were determined with a flame-photometer and magnesium was measured by atomic absorption. The extractable acidity was determined by the barium chloride-triethanolamine method (7).

The total extractable calcium, potassium, magnesium, sodium, and extractable acidity is an approximation of the cation-exchange capacity of the soil. Except in soils that contain soluble salts, base saturation was determined by dividing this total into the sum of calcium, potassium, magnesium, and sodium, and multiplying by 100.

### **engineering index test data**

Table 20 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by the Arkansas State Highway Department.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

The tests and methods are: AASHTO classification—M 145 (AASHTO), D 3282 (ASTM); Unified classification—D 2487 (ASTM); Mechanical analysis—T 88 (AASHTO), D 2217 (ASTM); Liquid limit—T 89 (AASHTO), D 423 (ASTM); Plasticity index—T 90 (AASHTO), D 424 (ASTM); and Moisture density, Method A—T 99 (AASHTO), D 698 (ASTM).

# classification of the soils

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The system of soil classification used by the National Cooperative Soil Survey has six categories (8). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 21, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

**ORDER.** Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

**SUBORDER.** Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

**GREAT GROUP.** Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that have an aquic moisture regime).

**SUBGROUP.** Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquolls.

**FAMILY.** Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class,

mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine, montmorillonitic, thermic Vertic Haplaquolls.

**SERIES.** The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

## soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (6). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (8). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

### Barling series

The Barling series consists of deep, moderately well drained, moderately permeable, level and nearly level soils on flood plains of local streams. These soils are formed in loamy alluvium derived from sandstone and shale. The native vegetation was mixed hardwood trees. Slopes are 0 to 2 percent.

Barling soils are geographically associated with Guthrie, Leadvale, and Spadra soils. All of the associated soils have an argillic horizon except Guthrie. Guthrie soils are in level depressional areas on old stream terraces, have a fine-silty control section, and have a fragipan. Leadvale soils are on old stream



terraces, have a fine-silty control section, and have a fragipan. Spadra soils are on similar positions nearer the streams, have a fine-loamy control section, and are well drained.

Typical pedon of Barling silt loam, occasionally flooded, in a field in the SW1/4NW1/4NE1/4 sec. 26, T. 8 N., R. 18 W.

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many fine roots; few fine pores; medium acid; abrupt smooth boundary.

A12—5 to 12 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky structure; friable; common fine roots; few fine pores; medium acid; clear smooth boundary.

B21—12 to 22 inches; brown (10YR 4/3) silt loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; strongly acid; clear smooth boundary.

B22—22 to 37 inches; mottled grayish brown (10YR 5/2) and brown (10YR 4/3) silt loam; weak medium subangular blocky structure; friable; few fine roots; few fine pores; strongly acid; gradual smooth boundary.

B23—37 to 51 inches; mottled light brownish gray (10YR 6/2), brown (10YR 4/3) and strong brown (7.5YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; common fine pores; strongly acid; gradual smooth boundary.

B24—51 to 72 inches; mottled strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) silt loam; weak medium subangular blocky structure; friable; few fine roots; common fine pores; strongly acid.

Depth to the horizon that has mottles in chroma 2 or grayer colors ranges from 6 to 24 inches. Reaction ranges from slightly acid to strongly acid in the A horizon and from slightly acid to very strongly acid in the B horizon.

The A horizon ranges from 5 to 16 inches in thickness. It has hue of 10YR with value of 4 and chroma of 2 or 3 or with value of 5 and chroma of 3.

The B21 horizon has hue of 10YR with value of 4 and chroma of 3 or 4 or with value of 5 or 6 and chroma of 3. Common medium mottles are gray and grayish brown. The B22, B23, and B24 horizons are mottled light brownish gray, brown, yellowish brown, strong brown, gray, or grayish brown. Texture is silt loam or very fine sandy loam.

### Bruno series

The Bruno series consists of deep, excessively drained, rapidly permeable, level to nearly level soils that formed in stratified, sandy alluvium on young natural levees along the Arkansas River. The native vegetation

was pecan, cottonwood, and willow trees. Slopes are 0 to 3 percent.

Bruno soils are geographically associated with Dardanelle, Roxana, and Rilla soils. These well drained soils are on older natural levees. Dardanelle and Rilla soils have a fine-silty control section and an argillic horizon. Roxana soils have a coarse-silty control section.

Typical pedon of Bruno loamy fine sand, 0 to 3 percent slopes, in field in the SW1/4NW1/4SW1/4 sec. 33, T. 7 N., R. 20 W.

Ap—0 to 6 inches; brown (10YR 5/3) loamy fine sand; single grained; loose; slightly acid; clear smooth boundary.

C1—6 to 13 inches; brown (10YR 5/3) loamy fine sand; single grained; loose; common bedding planes; slightly acid; clear smooth boundary.

C2—13 to 25 inches; pale brown (10YR 6/3) loamy fine sand; single grained; loose; common bedding planes; slightly acid; clear smooth boundary.

C3—25 to 31 inches; brown (10YR 5/3) very fine sandy loam; weak medium subangular blocky structure; very friable; common bedding planes; slightly acid; clear smooth boundary.

C4—31 to 72 inches; pale brown (10YR 6/3) loamy fine sand; single grained; very friable; common bedding planes; slightly acid.

Bedding planes are evident in the 10- to 40-inch control section. Reaction is medium acid to mildly alkaline throughout the profile.

The A horizon ranges from 5 to 10 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

The C horizon is stratified and has hue of 10YR with value of 4, 5, or 6 and chroma of 3 or with value of 4 and chroma of 4. Texture is loamy fine sand, fine sand, or sand and contains thin strata of loamy very fine sand, very fine sandy loam, or fine sandy loam.

### Cane series

The Cane series consists of deep, moderately well drained, slowly permeable, gently sloping soils on colluvial foot slopes and old stream terraces in broad valleys. These soils formed in loamy sediment derived from sandstone and shale. The native vegetation was mixed hardwood trees and some pines. Slopes are 3 to 8 percent.

Cane soils are geographically associated with Enders, Leadvale, Nella, Pickwick, and Taft soils. Enders soils are on higher positions than Cane soils, have a clayey control section, and do not have a fragipan. Leadvale soils are on similar positions, have a fine-silty control section, and are not as red as the Cane soils. Nella soils are on higher positions, are well drained, and do not have a fragipan. Pickwick soils are on similar positions and have a fine-silty control section without fragipans.

The somewhat poorly drained Taft soils are on lower positions, have a fine-silty control section, and do not have an argillic horizon above the fragipan.

Typical pedon of Cane loam, 3 to 8 percent slopes, in a field in the SW1/4SE1/4NE1/4 sec. 32, T. 8 N., R. 20 W.

- Ap—0 to 4 inches; dark brown (7.5YR 4/4) loam; weak fine granular structures; friable; many fine roots; few fine pores; medium acid; clear smooth boundary.
- A12—4 to 9 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; common fine roots; few fine pores; strongly acid; clear smooth boundary.
- B2t—9 to 24 inches; yellowish red (5YR 4/6) loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; common fine roots; common fine pores; few concretions; few black stains; strongly acid; clear smooth boundary.
- Bx1—24 to 37 inches; mottled yellowish red (5YR 4/6), yellowish brown (10YR 5/6), and light brownish gray (10YR 6/2) clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; thick patchy clay films on faces of peds and in pores; few fine roots in vertical gray streaks; many fine pores; few concretions; common vertical gray streaks 1/4 to 1 inch wide and 6 to 18 inches apart; common black stains; strongly acid; gradual wavy boundary.
- Bx2—37 to 48 inches; mottled yellowish red (5YR 4/6) yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; thick patchy clay films on faces of peds and in pores; few fine roots in vertical gray streaks; many fine pores; few concretions; common vertical gray streaks 1/4 to 1 inch wide and 6 to 18 inches apart; common black stains; strongly acid; gradual wavy boundary.
- Bx3—48 to 64 inches; mottled yellowish red (5YR 4/6), yellowish brown (10YR 5/6) and gray (10YR 5/1) clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, compact and brittle; thick patchy clay films on faces of peds and in pores; few fine roots in vertical streaks; many fine pores; few concretions; common vertical streaks 1/4 to 1 inch wide and 6 to 18 inches apart; few black stains; very strongly acid; gradual wavy boundary.
- B3—64 to 76 inches; mottled yellowish red (5YR 5/6) yellowish brown (10YR 5/6) and gray (10YR 6/1) silty clay loam; friable; common fine pores; few concretions; very strongly acid.

Solum thickness and depth to bedrock ranges from about 60 inches to more than 80 inches. Reaction is medium acid or strongly acid in the A horizon, and

strongly acid or very strongly acid in the B horizon. Depth to the fragipan ranges from 20 to 35 inches.

The A horizon ranges from 4 to 10 inches in thickness. It has hue of 7.5YR with value of 4 or 5 and chroma of 4 or hue of 10YR with value of 4 or 5 and chroma of 3 or 4.

The B2t horizon has hue of 5YR, value of 4 or 5, and chroma of 4, 6, or 8. Texture is loam, clay loam, or silty clay loam. The Bx horizon has hue of 10YR or 7.5YR with value of 5 and chroma of 6 or 8 or hue of 5YR with value of 4 or 5 and chroma of 6 or 8. It has common to many medium and coarse gray or light brownish gray mottles. Some pedons do not have dominant matrix color and are mottled or variegated with these colors. Texture is loam, clay loam, or silty clay loam. The B3 horizon has the same color and texture range as the Bx horizon.

### Ceda series

The Ceda series consists of deep, well drained, rapidly permeable, level and nearly level soils on flood plains along small streams in narrow valleys. These soils formed in cobbly, loamy sediments derived from sandstone and shale. The native vegetation was mixed hardwood trees and some pines. Slopes are 0 to 3 percent.

Ceda soils are associated with Spadra soils. Spadra soils are on slightly higher elevations on flood plains, have a fine-loamy control section, and have an argillic horizon.

Typical pedon of Ceda gravelly fine sandy loam in a wooded area of Spadra-Ceda association, occasionally flooded, in the NE1/4NE1/4SE1/4 sec. 5, T. 10 N., R. 18 W.

- O1—1 inch to 0; hardwood litter and water deposited debris.
- A1—0 to 4 inches; dark brown (10YR 4/3) gravelly fine sandy loam; weak medium granular structure; friable; many fine and medium roots; about 20 percent rounded sandstone gravel and a few cobbles; medium acid; clear wavy boundary.
- C1—4 to 20 inches; dark yellowish brown (10YR 4/4) very gravelly fine sandy loam; massive; friable; common fine and medium roots; about 35 percent rounded sandstone gravel and about 5 percent cobbles; medium acid; gradual wavy boundary.
- C2—20 to 72 inches; yellowish brown (10YR 5/4) very gravelly fine sandy loam; massive; friable; few fine and medium roots; about 70 percent rounded sandstone gravel and about 5 percent cobbles and stones; medium acid.

Reaction is slightly acid or medium acid throughout the profile.

The A horizon ranges from 4 to 14 inches in thickness. It has hue of 10YR, value of 3, 4, or 5, and chroma of 2



or 3. It has texture of fine sandy loam, gravelly fine sandy loam, or gravelly loam. Gravel content ranges from 5 to 35 percent.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4, or hue of 7.5YR with value of 4 and chroma of 4 or with value of 5 and chroma of 6. Texture is very gravelly fine sandy loam or very gravelly loam. Gravel, cobble, and stone content ranges from 35 to 80 percent.

### Dardanelle series

The Dardanelle series consists of deep, well drained, moderately permeable, level to gently undulating soils that formed in loamy alluvium on natural levees along the Arkansas River. The native vegetation was hardwood trees. Slopes are 0 to 3 percent.

Dardanelle soils are geographically associated with Bruno, Moreland, Rilla, Roellen, and Roxana soils. Bruno soils are on young natural levees, have a sandy control section, and do not have an argillic horizon. Moreland soils are in slack-water areas, have fine control sections, and are somewhat poorly drained. Rilla soils are on slightly higher positions and do not have a mollic epipedon. Roellen soils are in slack-water areas, have a fine control section, and are poorly drained. Roxana soils are on young natural levees, have a coarse-silty control section, and do not have an argillic horizon.

Typical pedon of Dardanelle silt loam, 0 to 1 percent slopes, in a field in the SW1/4NE1/4NE1/4 sec. 11, T. 6 N., R. 20 W.

- Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.
- A12—7 to 23 inches; very dark brown (10YR 2/2) silt loam; weak fine subangular blocky structure; friable; common fine roots; common fine tubular pores; common worm channels; slightly acid; clear smooth boundary.
- B21t—23 to 28 inches; dark reddish brown (5YR 3/3) silt loam; moderate medium subangular blocky structure; friable; dark brown (7.5YR 3/2) coatings on many faces of peds; thin patchy clay films on faces of peds; common fine roots; common fine tubular pores; few very dark brown (10YR 2/2) pockets of A material in worm channels; medium acid; clear smooth boundary.
- B22t—28 to 35 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky structure; firm; dark reddish brown (5YR 3/3) coatings on many faces of peds; thin patchy clay films on faces of peds; few fine roots; common fine tubular pores; few very dark brown (10YR 2/2) pockets of A material in worm channels; medium acid; clear smooth boundary.
- B23t—35 to 51 inches; reddish brown (5YR 4/4) silty clay loam; moderate medium subangular blocky

structure; firm; thin patchy clay films on faces of peds; few fine roots; few fine tubular pores; medium acid; clear smooth boundary.

C1—51 to 74 inches; brown (7.5YR 5/4) very fine sandy loam; massive; friable; medium acid; gradual smooth boundary.

C2—74 to 91 inches; brown (7.5YR 5/4) silt loam; massive; friable; common bedding planes; medium acid.

Solum thickness ranges from about 45 to 65 inches. Thickness of the mollic epipedon ranges from 20 to 40 inches. Reaction is medium acid to neutral in the A and the B horizons and medium acid to mildly alkaline in the C horizon.

The A horizon ranges from 10 to 26 inches thick. It has hue of 10YR and 5YR, value of 3, and chroma of 2 or 3; hue of 7.5YR, value of 3, and chroma of 2; or hue of 10YR, value of 2, and chroma of 2.

The B21t horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2, or hue of 5YR, value of 3, and chroma of 3. The B22t and B23t horizons have hue of 10YR, value of 4, and chroma of 3 or 4; hue of 7.5YR, value of 4, and chroma of 2 or 4; or hue of 5YR, value of 3 or 4, and chroma of 3 or 4. Texture is silt loam, clay loam, or silty clay loam.

The C horizon has hue of 5YR, value of 4 or 5, and chroma of 4 or 6, or hue of 7.5YR with value of 5 and chroma of 4 or 6 or with value of 4 and chroma of 4. Texture is very fine sandy loam, silt loam, or loam.

### Enders series

The Enders series consists of deep, well drained, very slowly permeable, gently sloping to very steep soils on hillsides, mountainsides, and ridges. These soils formed in a thin layer of loamy colluvial material and underlying clayey material developed from acid shale. The native vegetation was hardwood trees or mixed pines and hardwoods. Slopes are 3 to 65 percent.

Enders soils are geographically associated with Cane, Leadvale, Leesburg, Linker, Mountainburg, and Nella soils. Cane and Leadvale soils are on colluvial foot slopes and on old stream terraces in broad valleys. Cane soils have a fine-loamy control section and a fragipan. Leadvale soils have a fine-silty control section and a fragipan. The Linker and Mountainburg soils are on mountaintops, mountainsides, hilltops, hillsides, and benches and are shallower to bedrock than Enders soils. Linker soils have a fine-loamy control section. Mountainburg soils have a loamy-skeletal control section. Leesburg and Nella soils are on mountainsides, benches and foot slopes and have a fine-loamy control section.

Typical pedon of Enders gravelly fine sandy loam in a wooded area of Enders-Mountainburg association, steep, in the SE1/4SE1/4SW1/4 sec. 12, T. 12 N., R. 20 W.

O1—1 inch to 0; forest litter.

- A11—0 to 3 inches; dark brown (10YR 3/3) gravelly fine sandy loam; weak medium granular structure; very friable; many fine and medium roots; 25 percent small fragments of sandstone and shale; strongly acid; clear smooth boundary.
- A12—3 to 7 inches; strong brown (7.5YR 5/6) gravelly loam; weak medium subangular blocky structure; friable; many fine and medium roots; 20 percent fragments of sandstone and shale; very strongly acid; clear smooth boundary.
- B21t—7 to 18 inches; yellowish red (5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; continuous clay films on faces of peds; common fine roots; few fine pores; 15 percent fragments of shale; very strongly acid; gradual wavy boundary.
- B22t—18 to 28 inches; red (2.5YR 5/6) clay; moderate medium subangular blocky structure; firm; continuous clay films on faces of peds; common fine roots; few fine pores; 10 percent gray fragments of shale; very strongly acid; gradual wavy boundary.
- B23t—28 to 36 inches; red (2.5YR 5/6) clay; common medium distinct grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; continuous clay films on faces of peds; few fine roots; few fine pores; 10 percent fragments of shale; very strongly acid; gradual wavy boundary.
- B24t—36 to 48 inches; mottled red (2.5YR 4/6) and gray (10YR 6/1) clay; moderate medium subangular blocky structure; firm; continuous clay films on faces of peds; few fine roots; few fine pores; 10 percent fragments of shale; very strongly acid; gradual wavy boundary.
- B3—48 to 56 inches; mottled yellowish red (5YR 5/6) and gray (10YR 6/1) shaly silty clay; weak medium subangular blocky structure; firm; continuous clay films on faces of peds; few fine pores; 25 percent gray fragments of shale; very strongly acid; clear wavy boundary.
- R—56 to 62 inches; shale bedrock.

Solum thickness ranges from 40 to 59 inches. Depth to bedrock ranges from 40 to more than 62 inches. Reaction is strongly acid or very strongly acid throughout. Gray mottles in the Bt horizon are attributed to the parent material and are not believed to indicate wetness.

The A horizon ranges from 3 to 8 inches in thickness. The A11 horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The A12 horizon has hue of 10YR, value of 5, and chroma of 3 or 4 or hue of 7.5YR, value of 5, and chroma of 4 or 6. Texture is gravelly fine sandy loam or stony fine sandy loam. Gravel content ranges from 0 to 30 percent. Sandstone fragments up to 12 inches in diameter range from 0 to 20 percent.

The B1 horizon, where present, has hue of 7.5YR, value of 5, and chroma of 6 or 8. Texture is loam or silt loam. The B2t horizon has hues of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. The lower B2t horizon is

commonly mottled in shades of red, brown, and gray. The B3 horizon has mottled patterns of red, brown, and gray. Sandstone fragments range from 0 to 15 percent in the B1 and B2t horizons. Shale fragments make up 10 to 25 percent of the B3 and C horizons, when present. Texture of the B2t and B3 horizons is silty clay or clay.

## Guthrie series

The Guthrie series consists of deep, poorly drained, slowly permeable, level soils on old stream terraces in broad valleys. These soils formed in loamy sediments derived from sandstone and shale. They are saturated with water during late winter and early spring. The native vegetation was hardwood trees and tall grasses. Slopes are 0 to 1 percent.

Guthrie soils are geographically associated with Barling, Leadvale, and Taft soils. Barling soils are on flood plains, have a coarse-silty control section, and are moderately well drained. Leadvale soils are on higher positions, have an argillic horizon above the fragipan, and are moderately well drained. Taft soils are on slightly higher positions and are somewhat poorly drained.

Typical pedon of Guthrie silt loam, 0 to 1 percent slopes, in a meadow in the SE1/4SE1/4NW1/4 sec. 32, T. 8 N., R. 20 W.

- Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; few fine pores; few concretions; strongly acid; clear smooth boundary.
- B1g—5 to 13 inches; grayish brown (10YR 5/2) silt loam; common medium faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky structure; friable; common fine roots; few fine pores; few concretions; very strongly acid; clear smooth boundary.
- B2g—13 to 23 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct dark grayish brown (10YR 4/2) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; few concretions; very strongly acid; clear smooth boundary.
- Bx1—23 to 37 inches; gray (10YR 6/1) silty clay loam; few medium distinct dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm, compact and brittle; thin patchy clay films on faces of peds and in pores; few fine roots; common fine pores; common concretions; very strongly acid; gradual smooth boundary.
- Bx2—37 to 48 inches; gray (10YR 6/1) silty clay loam; moderate medium distinct strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm, compact and brittle; thin patchy clay films on faces of peds and in pores; common fine pores; many concretions; very strongly acid; gradual smooth boundary.



Bx3—48 to 60 inches; mottled gray (10YR 5/1), dark yellowish brown (10YR 4/4) and strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; firm, compact and brittle; thin patchy clay films on faces of peds and in pores; common fine pores; many concretions; very strongly acid; gradual smooth boundary.

B3—60 to 74 inches; mottled gray (10YR 5/1) and strong brown (7.5YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine pores; common concretions; very strongly acid.

Solum thickness ranges from about 60 to 80 inches or more. Unless the surface layer has been limed, reaction is very strongly acid throughout. Depth to fragipan ranges from 20 to 35 inches.

The A horizon ranges from 4 to 10 inches in thickness. It has hue of 10YR, value of 4, 5, or 6, chroma of 2, 3, or 4. There are few to common, fine and medium brown mottles.

The B1g and B2g horizons have hue of 10YR, value of 5, 6, or 7, and chroma of 1 or 2. There are few to common, fine and medium brown mottles. Texture is silt loam or silty clay loam. The Bx horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. There are few to many mottles in shades of red and brown. The lower part of the Bx horizon, in some pedons, is mottled gray, yellow, red, and brown and does not have a dominant color. Texture is silt loam or silty clay loam.

### Leadvale series

The Leadvale series consists of deep, moderately well drained, slowly permeable, nearly level to gently sloping soils on colluvial foot slopes and on old stream terraces in broad valleys. These soils formed in loamy sediment derived from sandstone and shale. The native vegetation was chiefly mixed hardwood trees and some pines. Slopes are 1 to 8 percent.

Leadvale soils are geographically associated with Barling, Cane, Enders, Guthrie, Pickwick, and Taft soils. Barling soils are on flood plains of local streams, have a coarse-silty control section, and do not have a fragipan. Cane soils are on similar positions, have a fine-loamy control section, and are redder than Leadvale soils. Enders soils are on higher positions, have a clayey control section, do not have a fragipan, and are well drained. Pickwick soils are on higher positions, are redder, and do not have a fragipan. Guthrie and Taft soils are on similar positions, are poorly drained and somewhat poorly drained, and do not have an argillic horizon above the fragipan.

Typical pedon of Leadvale silt loam, 1 to 3 percent slopes, in a field in the SE1/4NE1/4NE1/4 sec. 29, T. 7 N., R. 19 W.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; moderate medium granular structure; friable; many fine roots; strongly acid; clear smooth boundary.

B1—6 to 14 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; common fine roots; very strongly acid; clear smooth boundary.

B2t—14 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; moderate medium subangular structure; friable; common fine roots; few fine dark concretions; thin patchy clay films on faces of peds; very strongly acid; clear wavy boundary.

Bx1—24 to 40 inches; mottled strong brown (7.5YR 5/6) and yellowish brown (10YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak platy structure parting to moderate medium subangular blocky; firm, compact and brittle; few fine dark concretions; continuous clay films on faces of peds; fine silt coatings on faces of peds; very strongly acid; gradual wavy boundary.

Bx2—40 to 56 inches; mottled yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; weak platy structure parting to moderate medium subangular blocky; firm, compact and brittle; few fine dark concretions; patchy clay films on faces of peds; fine pockets of gray silt; very strongly acid; gradual wavy boundary.

B3—56 to 72 inches; strong brown (7.5YR 5/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few fine dark concretions; patchy clay films on faces of peds; very strongly acid.

Solum thickness ranges from about 48 inches to more than 80 inches. Reaction is strongly acid or very strongly acid throughout. Content of shale fragments ranges from 0 to 10 percent in each horizon. Depth to the fragipan ranges from 16 to 38 inches. Depth to bedrock ranges from 48 inches to more than 96 inches.

The Ap horizon ranges from 5 to 8 inches in thickness. It has hue of 10YR with value of 4 and chroma of 2 or 3 or with value of 5 and chroma of 3.

The B1 horizon has hue of 10YR, value of 5, and chroma of 6 or 8. Texture is silt loam or silty clay loam. The B2t horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. Few to common, fine and medium light gray mottles are in the lower part of the horizon in some pedons. Texture is silt loam or silty clay loam. The Bx horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8, and it has common to many medium and coarse light gray and light brownish gray mottles. Some pedons do not have a dominant matrix color and are mottled or variegated with these colors. Texture is silt loam or silty clay loam. The B3 horizon has the same color range as the Bx horizon. Texture is silty clay loam or silt loam.

## Leesburg series

The Leesburg series consists of deep, well drained, moderately permeable steep soils on hillsides, mountainsides, foot slopes and benches. These soils formed in loamy colluvium from acid sandstone and shale. The native vegetation was hardwood trees or mixed pines and hardwoods. Slopes range from 20 to 40 percent.

Leesburg soils are geographically associated with Enders, Linker, Mountainburg, and Nella soils. The Enders soils are on similar positions, and have a clayey control section. The Linker soils are on hilltops and mountaintops, have redder colors, and are 20 to 40 inches deep over sandstone bedrock. The Mountainburg soils are on tops and sides of hills, mountains, and ridges, have a loamy-skeletal control section, and are less than 20 inches deep over sandstone bedrock. The Nella soils are on similar positions and have yellowish red or red subsoil.

Typical pedon of Leesburg gravelly loam in an area of Leesburg-Enders association, steep, NW1/4NE1/4SE1/4 sec. 17, T. 12 N., R. 19 W.

O1—1 inch to 0; forest litter.

A1—0 to 6 inches; dark brown (10YR 4/3) gravelly loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent small and medium sandstone gravel; strongly acid; clear smooth boundary.

B1—6 to 15 inches; strong brown (7.5YR 5/6) gravelly loam; weak fine subangular blocky structure; friable; common fine roots; few fine pores; 15 percent small and medium sandstone gravel; strongly acid; clear smooth boundary.

B21t—15 to 24 inches; strong brown (7.5YR 5/6) gravelly loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; common fine roots; few fine pores; 15 percent small and medium sandstone gravel; very strongly acid; clear smooth boundary.

B22t—24 to 48 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots; few fine pores; 15 percent small and medium sandstone gravel; very strongly acid; gradual smooth boundary.

B23t—48 to 72 inches; strong brown (7.5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots; few fine pores; 20 percent small and medium sandstone gravel; very strongly acid.

Solum thickness ranges from 60 to 80 inches. Reaction is strongly acid or very strongly acid throughout. Content of coarse fragments ranges from about 10 to about 30 percent in each horizon.

The A1 horizon is 5 to 8 inches thick. It has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is gravelly loam or cobbly loam.

The B2 horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. Texture is gravelly loam or gravelly clay loam. Few to common, fine or medium red or brown mottles are common in the lower part of the subsoil.

## Linker series

The Linker series consists of moderately deep, well drained, moderately permeable, nearly level to rolling soils on hilltops and mountaintops. These soils developed from acid sandstone bedrock. The native vegetation was mixed hardwood trees and pines. Slopes are 1 to 20 percent.

Linker soils are geographically associated with Enders, Leesburg, Mountainburg, and Nella soils. The deep Enders soils are on sides of hills, mountains, and ridges and have a clayey control section. Leesburg and Nella soils, on mountainsides, benches, and foot slopes, have sola more than 60 inches deep. The shallow Mountainburg soils are on similar positions, have a loamy-skeletal control section, and are 12 to 20 inches deep over sandstone bedrock.

Typical pedon of Linker fine sandy loam, 3 to 8 percent slopes, in a pasture in the SW1/4SW1/4NW1/4 sec. 35, T. 9 N., R. 19 W.

Ap—0 to 5 inches; brown (10YR 5/3) fine sandy loam; weak medium granular structure; very friable; many fine roots; common fine pores; few wormcasts; slightly acid; clear wavy boundary.

B1—5 to 10 inches; yellowish red (5YR 4/6) loam; weak medium subangular blocky structure; friable; common fine roots; many medium pores; clay coatings and bridging on sand grains and in pores; many wormcasts; medium acid; clear wavy boundary.

B2t—10 to 25 inches; yellowish red (5YR 4/8) loam; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; common patchy thin clay films on faces of peds and in pores; very strongly acid; clear wavy boundary.

B3—25 to 35 inches; yellowish red (5YR 4/8) gravelly fine sandy loam; common medium distinct red (2.5YR 4/6), strong brown (7.5YR 5/6), and common medium prominent pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common fine pores; few patchy thin clay films on faces of peds; very strongly acid; abrupt wavy boundary.

R—35 to 37 inches; level-bedded acid sandstone.

Solum thickness ranges from 20 to 40 inches over acid sandstone bedrock. Reaction is strongly acid or very strongly acid throughout unless the surface layer has been limed.



The A1 or Ap horizon ranges from 4 to 7 inches thick. It has hue of 10YR with value of 4 and chroma of 2 or 4 or with value of 4 or 5 and chroma of 3 or hue of 7.5YR with value of 4 or 5 and chroma of 4 or with value of 4 and chroma of 2. The A2 horizon has hue of 10YR, value of 5, and chroma of 3 or 4 or hue of 7.5YR, value of 5, and chroma of 4. The content of sandstone fragments as much as 12 inches in diameter ranges from 0 to 15 percent.

The B1 horizon has hue of 7.5YR, value of 5, and chroma of 6 or hue of 5YR, value of 4 or 5, and chroma of 6 or 8. Texture is fine sandy loam, sandy clay loam, or loam. The content of sandstone fragments up to 12 inches in diameter ranges from 0 to 10 percent. The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. Texture is sandy clay loam, clay loam, or loam. The content of sandstone fragments up to 12 inches in diameter ranges from 0 to 10 percent. The B3 horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In some places it is mottled or variegated with shades of brown. Texture is fine sandy loam or sandy clay loam. The content of sandstone fragments up to 12 inches in diameter ranges from 0 to 25 percent.

### McKamie series

The McKamie series consists of deep, well drained, very slowly permeable gently sloping soils. These soils formed in stratified loamy and clayey alluvium on high terraces along the Arkansas River. The native vegetation was mixed hardwood trees and pines. Slopes are 3 to 8 percent.

McKamie soils are geographically associated with Muskogee and Wrightsville soils. Muskogee soils are on slightly lower positions, are moderately well drained, and have a fine-silty control section. Wrightsville soils are on lower positions, are poorly drained, and have a grayer subsoil.

Typical pedon of McKamie very fine sandy loam, 3 to 8 percent slopes, in a field in the NE1/4SW1/4NE1/4 sec. 15, T. 6 N., R. 19 W.

- A11—0 to 2 inches; dark brown (7.5YR 4/4) very fine sandy loam; weak fine granular structure; friable; common fine roots; medium acid; clear smooth boundary.
- A12—2 to 4 inches; brown (7.5YR 5/4) very fine sandy loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.
- B21t—4 to 18 inches; red (2.5YR 4/6) silty clay; moderate fine angular blocky structure; firm; thin patchy clay films on faces of peds; common fine roots; common slickensides; very strongly acid; gradual smooth boundary.
- B22t—18 to 27 inches; red (2.5YR 4/6) silty clay, moderate fine angular blocky structure; firm; thin patchy clay films on faces of peds; few fine roots;

common slickensides; strongly acid; gradual wavy boundary.

- B23t—27 to 42 inches; red (2.5YR 4/6) silty clay; strong medium angular blocky structure; firm; thin patchy clay films on faces of peds; few fine roots; common slickensides; very strongly acid; gradual wavy boundary.

- IIC1—42 to 56 inches; mottled yellowish red (5YR 5/6) and red (2.5YR 4/6) clay loam; massive; firm; few fine roots; common slickensides; strongly cemented; very strongly acid; diffuse smooth boundary.

- IIC2—56 to 72 inches; mottled strong brown (7.5YR 5/6) and red (2.5YR 4/6) silty clay loam; massive; firm; strongly cemented; very strongly acid.

Solum thickness ranges from 36 to 60 inches.

Reaction is slightly acid to strongly acid in the A horizon and is medium acid to very strongly acid in the upper part of the Bt horizon. Below a depth of 30 inches the reaction ranges from very strongly acid to moderately alkaline and is calcareous in places.

The A horizon ranges from 3 to 10 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or hue of 7.5YR, value of 4 or 5, and chroma of 2 or 4.

The B2t horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4, 6, or 8. Texture is clay or silty clay.

The IIC horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 4, 6, or 8. Texture is clay loam, silty clay loam, silt loam, or very fine sandy loam.

### Moreland series

The Moreland series consists of deep, somewhat poorly drained, very slowly permeable level soils. These soils formed in clayey sediments in slack-water areas on flood plains of the Arkansas River. The native vegetation was pecan, cottonwood, and willow trees. Slopes are dominantly less than 1 percent.

Moreland soils are geographically associated with the Dardanelle, Rilla, and Roellen soils. Dardanelle and Rilla soils are on natural levees, have fine-silty control sections, and are well drained. Roellen soils are on similar positions, have grayer colors, and are poorly drained.

Typical pedon of Moreland silty clay, 0 to 1 percent slopes, in a field in the SW1/4NW1/4NE1/4 sec. 1, T. 6 N., R. 18 W.

- Ap—0 to 6 inches; dark reddish brown (5YR 3/3) silty clay; weak fine granular structure; firm; many fine roots; neutral; clear smooth boundary.
- A12—6 to 20 inches; dark reddish brown (5YR 3/3) silty clay; moderate fine subangular blocky structure; firm; common slickensides; common fine roots; neutral; gradual smooth boundary.
- B21—20 to 31 inches; dark reddish brown (5YR 3/2) silty clay; moderate fine subangular blocky structure;

firm; common slickensides; few fine roots; neutral; gradual smooth boundary.

B22—31 to 46 inches; reddish brown (5YR 4/3) silty clay; moderate fine subangular blocky structure; firm; common slickensides; mildly alkaline; calcareous; clear smooth boundary.

B3—46 to 72 inches; reddish brown (5YR 4/4) silty clay loam; weak fine subangular blocky; mildly alkaline; calcareous.

Solum thickness ranges from about 40 to 72 inches or more. Reaction ranges from slightly acid to mildly alkaline in the A horizon and from neutral to moderately alkaline in the B horizon. The soil is calcareous between 10 and 40 inches in some places.

The A horizon ranges from 10 to 22 inches thick. It has hue of 7.5YR, value of 3, and chroma of 2 or hue of 5YR, value of 3, and chroma of 2 or 3.

The B2 horizon has hue of 5YR with value of 3 and chroma of 2, 3, or 4 or with value of 4 and chroma of 3 or 4. Texture of the B2 horizon is silty clay or clay. The B3 horizon has hue of 5YR, value of 4, and chroma of 3 or 4. Texture is clay, silty clay, or silty clay loam.

These soils are taxadjuncts to the Moreland series in that they do not have gray mottles within 30 inches of the surface. However, use, behavior, and management are the same as for the Moreland series.

## Mountainburg series

The Mountainburg series consists of shallow, well-drained, moderately rapidly permeable, gently sloping to very steep soils on tops and sides of ridges, hills, and mountains. These soils developed from acid sandstone bedrock. The native vegetation was mixed hardwood trees and pines that had an understory of tall grasses. Slopes are 1 to 65 percent.

Mountainburg soils are geographically associated with Enders, Leesburg, Linker, and Nella soils. Enders soils are on side slopes, have a clayey control section, and are deeper to bedrock. Leesburg and Nella soils are on hillsides, mountainsides, foot slopes, and benches, have a fine-loamy control section, and are deeper to bedrock. Linker soils are on hilltops and mountaintops, have a fine-loamy control section, and are 20 to 40 inches deep over sandstone bedrock.

Typical pedon of Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes, in a native grass pasture in the SE1/4SE1/4NE1/4 sec. 17, T. 8 N., R. 20 W.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) gravelly fine sandy loam; moderate medium granular structure; friable; many fine and medium roots; 20 percent fragments of sandstone; strongly acid; clear smooth boundary.

A2—2 to 6 inches; brown (10YR 4/3) gravelly fine sandy loam; weak medium granular structure; friable; many fine and medium roots; 35 percent fragments of sandstone; strongly acid; clear wavy boundary.

B2t—6 to 15 inches; strong brown (7.5YR 5/6) very gravelly loam; weak medium subangular blocky structure; friable; common fine and medium roots; thin patchy clay films on faces of peds; sand grains coated and bridged; 45 percent fragments of sandstone 1/4 inch to 12 inches in diameter; very strongly acid; abrupt wavy boundary.

R—15 to 17 inches; level-bedded acid sandstone bedrock.

Solum thickness ranges from 12 to 20 inches over acid sandstone bedrock. Reaction is medium acid to very strongly acid in the A horizon and is strongly acid or very strongly acid in the B horizon.

The A horizon ranges from 3 to 10 inches in thickness. It has hue of 10YR with value of 3 or 4 and chroma of 2 or 3 or with value of 5 and chroma of 3. Texture is gravelly fine sandy loam or stony fine sandy loam. The content of sandstone fragments up to 12 inches in diameter ranges from 15 to 35 percent.

The B1 horizon, where present, has hue of 7.5YR with value of 4 and chroma of 4 or with value of 5 and chroma of 4 or 6. Texture is gravelly fine sandy loam, very gravelly fine sandy loam, or stony fine sandy loam. The content of sandstone fragments up to 12 inches in diameter ranges from 15 to 50 percent. The B2t horizon has hue of 7.5YR, value of 5, and chroma of 6, or it has hue of 5YR, value of 4, and chroma of 8. It has 35 to 65 percent sandstone gravel and stones, and the fine earth texture is fine sandy loam, loam, or sandy clay loam that has textural modifier of very gravelly or very stony.

## Muskogee series

The Muskogee series consists of deep, moderately well drained, slowly permeable, nearly level to gently sloping soils. These soils formed in stratified loamy and clayey alluvium on high terraces along the Arkansas River. The native vegetation was mixed hardwood trees and pines. Slopes are 1 to 8 percent.

Muskogee soils are geographically associated with McKamie and Wrightsville soils. McKamie soils are on slightly higher positions, are well drained, and have a clayey control section. Wrightsville soils are on slightly lower positions, are poorly drained, and have a fine control section.

Typical pedon of Muskogee silt loam, 1 to 3 percent slopes, in a meadow, NE1/4NW1/4NW1/4 sec. 24, T. 7 N., R. 18 W.

Ap—0 to 4 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; many fine roots; common fine pores; strongly acid; clear smooth boundary.

A2—4 to 10 inches; yellowish brown (10YR 5/4) silt loam; weak fine subangular blocky structure; friable; many fine roots; common fine pores; strongly acid; clear smooth boundary.



- B1—10 to 15 inches, yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; common fine roots; very strongly acid; gradual smooth boundary.
- B21t—15 to 25 inches, yellowish brown (10YR 5/6) silty clay loam; few fine distinct light gray mottles; friable; thin patchy clay films on faces of peds; very strongly acid; gradual wavy boundary.
- B22t—25 to 45 inches; yellowish red (5YR 5/6) silty clay, common medium distinct light brownish gray (10YR 6/2) mottles; very firm; thin patchy clay films on faces of peds; medium acid, gradual wavy boundary.
- B23t—45 to 72 inches; yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; very firm; thin patchy clay films on faces of peds; common dark stains; medium acid.

Solum thickness ranges from 60 to 80 inches or more. Reaction ranges from very strongly acid to medium acid through the B22t horizon. The B23t horizon is strongly acid through mildly alkaline and contains calcareous concretions in some places.

The A horizon ranges from 4 to 10 inches in thickness. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR, value of 5, and chroma of 3 or 4.

The B1 horizon has hue of 10YR, value of 5 or 6, and chroma of 4 or 6. The B21t horizon has hue of 10YR, value of 5, and chroma of 4 or 6, or hue of 7.5YR, value of 5, and chroma of 6 or 8. Few or common, fine or medium grayish brown or light brownish gray mottles are sometimes present. Texture of the B1 and B21t horizons is silt loam or silty clay loam. The B22t and B23t horizons have hue of 10YR, value of 6 or 7, and chroma of 1 or 2; hue of 5YR, value of 4 or 5, and chroma of 6; or hue of 2.5YR, value of 4, and chroma of 6. In some pedons, red colors are dominant, and mottles are of grayer colors. Others have mottled or variegated color pattern with no dominant color. Texture of the B22t and B23t horizons is silty clay or clay.

## Nella series

The Nella series consists of deep, well drained, moderately permeable, gently sloping to very steep soils on hillsides, mountainsides, foot slopes, and benches. These soils formed in loamy colluvium from acid sandstone and shale. The native vegetation was hardwood trees or mixed pines and hardwoods. Slopes range from 3 to 50 percent.

Nella soils are geographically associated with Cane, Enders, Leesburg, Linker, and Mountainburg soils. The Cane soils are on lower positions, are moderately well drained, and have a fragipan. The Enders soils are in similar positions and have a clayey control section. The Leesburg soils are on similar positions and have yellowish brown or strong brown subsoils. The Linker

soils are on hilltops and mountaintops and are 20 to 40 inches deep over sandstone bedrock. The Mountainburg soils are on tops and sides of hills, mountains, and ridges, have a loamy-skeletal control section, and are less than 20 inches deep over sandstone bedrock.

Typical pedon of Nella gravelly fine sandy loam in an area of Nella-Enders association, rolling, SE1/4NW1/4NE1/4 sec. 7, T. 10 N., R. 19 W.

- O1—1 inch to 0; forest litter.
- A11—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; few fine pores; about 20 percent, by volume, is fragments of sandstone 1/4 inch to 8 inches in diameter; strongly acid; abrupt smooth boundary.
- A12—3 to 9 inches; brown (10YR 4/3) gravelly fine sandy loam; weak fine subangular blocky structure; friable; many fine and medium roots; about 15 percent, by volume, is fragments of sandstone 1/4 inch to 8 inches in diameter; strongly acid; clear smooth boundary.
- B1—9 to 17 inches; strong brown (7.5YR 5/6) gravelly loam; weak fine subangular blocky structure; friable; common fine roots; few fine pores; about 15 percent, by volume, is fragments of sandstone 1/4 inch to 8 inches in diameter; very strongly acid; clear smooth boundary.
- B21t—17 to 27 inches; yellowish red (5YR 5/6) gravelly clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; common fine roots; few fine pores; about 30 percent, by volume, is fragments of sandstone 1/4 inch to 8 inches in diameter; very strongly acid; gradual smooth boundary.
- B22t—27 to 47 inches; yellowish red (5YR 5/8) gravelly clay loam; few fine and medium distinct red (2.5YR 4/6) mottles; moderate medium subangular structure; friable; thin patchy clay films on faces of peds; few fine roots; few fine pores; about 15 percent, by volume, is fragments of sandstone 1/4 inch to 8 inches in diameter; very strongly acid; gradual smooth boundary.
- B23t—47 to 72 inches; mottled red (2.5YR 4/6), yellowish red (5YR 5/6) and strong brown (7.5YR 5/8) clay loam; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots; few fine pores; about 10 percent, by volume, is fragments of sandstone 1/4 inch to 8 inches in diameter; very strongly acid.

Solum thickness ranges from 60 to 80 inches or more. Reaction is strongly acid or very strongly acid throughout. Content of coarse fragments ranges from about 10 to 35 percent in each horizon.

The A horizon ranges from 5 to 10 inches thick. It has hue of 10YR, value of 4, and chroma of 2 or 3. Texture is gravelly fine sandy loam or stony fine sandy loam.

The B1 horizon has hue of 7.5YR, value of 5, and chroma of 6 or hue of 5YR, value of 4 or 5, and chroma of 4, 6, or 8. Texture is gravelly loam or gravelly clay loam. The B2t horizon has hue of 5YR, value of 4 or 5, and chroma of 6 or 8 or hue of 2.5YR with value of 3 and chroma of 6 or with value of 4 or 5 and chroma of 6 or 8. Texture is clay loam, sandy clay loam, gravelly clay loam, or gravelly sandy clay loam.

### Pickwick series

The Pickwick series consists of deep, well drained, moderately permeable, nearly level to gently sloping soils on stream terraces. These soils formed in loamy sediment derived from sandstone and shale. The native vegetation was mixed hardwood trees and some pines. Slopes are 1 to 8 percent.

Pickwick soils are geographically associated with Cane and Leadvale soils. Cane soils are on similar positions, have a fragipan, and have a fine-loamy control section. Leadvale soils are on lower positions, are less red, and have a fragipan.

Typical pedon of Pickwick silt loam, 3 to 8 percent slopes, in a pasture in the SE1/4NW1/4SE1/4 sec. 16, T. 9 N., R. 20 W.

- Ap—0 to 6 inches dark brown (7.5YR 4/4) silt loam; weak medium granular structure; friable; many fine roots; medium acid; clear smooth boundary.
- B1—6 to 16 inches; yellowish red (5YR 4/6) silty clay loam; weak medium subangular blocky structure; friable; many fine roots; strongly acid; clear smooth boundary.
- B21t—16 to 30 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; thin patchy clay films on faces of peds; common fine roots and pores; black streaks and stains on faces of peds; strongly acid; gradual wavy boundary.
- B22t—30 to 48 inches; red (2.5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few brownish streaks 1/2 inch wide; thin patchy clay films on faces of peds; few fine roots and pores; black streaks and stains on faces of peds; few fine dark concretions; strongly acid; gradual wavy boundary.
- B23t—48 to 59 inches; yellowish red (5YR 4/6) silty clay loam; moderate medium subangular blocky structure; friable; few brownish yellow streaks 1/2 inch wide; thin patchy clay films on faces of peds; few fine roots and pores; black streaks and stains on faces of some peds; few fine dark concretions; strongly acid; gradual smooth boundary.
- B3—59 to 72 inches; red (2.5YR 4/6) silty clay loam; common medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots and pores; black streaks and

stains on faces of some peds; few dark concretions; very strongly acid.

Solum thickness range is more than 72 inches. Reaction is strongly or very strongly acid throughout unless the surface has been limed.

The Ap horizon ranges from 4 to 8 inches thick. It has hue of 10YR, value of 4, and chroma of 3 or 4, or hue of 7.5YR, value of 4, and chroma of 4.

The B1 horizon has hue of 5YR, value of 4, and chroma of 4 or 6. Texture is silt loam or silty clay loam. The B2t and B3 horizons have hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 or 6. The B3 horizon is commonly mottled with brown, yellowish brown, and light brownish gray.

### Rilla series

The Rilla series consists of deep, well drained, moderately permeable level to nearly level soils. These soils formed in loamy alluvium on natural levees along the Arkansas River. The native vegetation was mixed hardwood trees. Slopes are less than 2 percent.

Rilla soils are geographically associated with Bruno, Dardanelle, Moreland, and Roxana soils. Bruno and Roxana soils are on younger natural levees and have coarser textured control sections than Rilla soils. Dardanelle soils are on slightly lower positions and have a mollic epipedon. Moreland soils are on lower positions, have a clayey control section, and are somewhat poorly drained. Roxana soils are less acid.

Typical pedon of Rilla silt loam, 0 to 2 percent slopes, in a field in NE1/4NE1/4SE1/4 sec. 32, T. 7 N., R. 18 W.

- Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; clear smooth boundary.
- B21t—6 to 29 inches; brown (7.5YR 5/4) silt loam; weak fine subangular blocky structure; friable; sand grains coated and bridged with clay; few fine roots; few fine pores; strongly acid; gradual smooth boundary.
- B22t—29 to 36 inches; mottled brown (7.5YR 5/4) and yellowish red (5YR 5/4) silt loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; few fine roots; few fine pores; strongly acid; gradual wavy boundary.
- B31—36 to 47 inches; mottled reddish brown (5YR 5/4) and yellowish red (5YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; few fine pores; strongly acid; gradual wavy boundary.
- IIB32—47 to 58 inches; yellowish red (5YR 5/6) loam; weak medium subangular blocky structure; friable; strongly acid; gradual wavy boundary.
- IIC—58 to 72 inches; yellowish red (5YR 5/6) loam; common medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; medium acid.



Solum thickness ranges from 40 to 60 inches. Depth to stratified material is 48 to 72 inches or more. Reaction is slightly acid to strongly acid in the A horizon, strongly acid or very strongly acid in the B horizon, and very strongly acid to moderately alkaline in the C horizon.

The Ap horizon ranges from 5 to 8 inches thick. It has hue of 10YR, value of 4 or 5, and chroma of 2 or 3 or hue of 7.5YR, value of 4 or 5, and chroma of 2. Texture is very fine sandy loam or silt loam.

The B2t horizon has hue of 7.5YR, value of 5, and chroma of 4 or 6 or hue of 5YR, value of 4 or 5, and chroma of 3 through 6. Texture is silt loam, silty clay loam, or clay loam. The B3 horizon has hue of 5YR, value of 4 or 5, and chroma of 4 or 6.

The IIB3 and IIC horizons have hue of 5YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. Texture is loam or silty clay loam.

### Roellen series

The Roellen series consists of deep, poorly drained, slowly permeable level soils. These soils formed in clayey sediments in slack-water areas on the flood plain of the Arkansas River. The native vegetation was pecan, cottonwood, and willow trees. Slopes are less than 1 percent.

Roellen soils are geographically associated with the Dardanelle and Moreland soils. Dardanelle soils are on natural levees, have fine-silty control sections, and are well drained. Moreland soils are on similar positions, have redder colors, and are somewhat poorly drained.

Typical pedon of Roellen clay, 0 to 1 percent slopes, in a field in the SE1/4NW1/4NW1/4 sec. 35, T. N., R. 18 W.

Ap—0 to 11 inches; very dark gray (10YR 3/1) clay; moderate medium granular structure; firm; plastic; many fine roots; few fine pores; neutral; abrupt smooth boundary.

B2g—11 to 42 inches; dark gray (10YR 4/1) clay; moderate medium blocky structure; firm; very plastic; common slickensides; common fine roots; few fine pores; neutral; diffuse smooth boundary.

C1g—42 to 56 inches; dark gray (5YR 4/1) clay; common medium distinct brown (7.5YR 4/4) mottles; massive; firm; very plastic; common slickensides; common calcium carbonate concretions; mildly alkaline; gradual smooth boundary.

IIC2—56 to 80 inches; reddish brown (5YR 4/4) clay; massive; very firm; very plastic; common slickensides; mildly alkaline.

Solum thickness ranges from about 40 to 65 inches. Reaction ranges from medium acid to neutral in the A horizon and from slightly acid to mildly alkaline in the B and C horizons.

The A horizon ranges from 10 to 20 inches thick. It has hue of 10YR, value of 3, and chroma of 1 or 2.

The B2g horizon has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. Few to common, fine and medium brown mottles are in the lower part of the horizon. Texture is silty clay or clay.

The C1g horizon has hue of 5YR or 10YR, value of 3 or 4, and chroma of 1 and the IIC horizon has hue of 5YR, value of 4, and chroma of 4. Texture is silty clay or clay.

### Roxana series

The Roxana series consists of deep, well drained, moderately permeable level soils. These soils formed in stratified, loamy alluvium on natural levees along the Arkansas River. The native vegetation was pecan, cottonwood, and willow trees. Slopes are 0 to 1 percent.

Roxana soils are geographically associated with the Bruno, Dardanelle, and Rilla soils. Bruno soils are on young natural levees, are sandier, and do not have cambic horizons. Dardanelle and Rilla soils are on slightly lower positions, have a fine-loamy control section, and have an argillic horizon.

Typical pedon of Roxana silt loam, 0 to 1 percent slopes, in a cultivated field in the NW1/4NW1/4NW1/4 sec. 33, T. 7 N., R. 20 W.

Ap—0 to 6 inches; dark brown (7.5YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; few fine pores; neutral; abrupt smooth boundary.

C1—6 to 16 inches; reddish brown (5YR 4/3) silt loam; weak medium granular structure; very friable; few fine roots; few fine pores; common bedding planes; neutral; gradual smooth boundary.

C2—16 to 28 inches; reddish brown (5YR 4/4) silt loam; massive; very friable; common bedding planes; neutral; gradual smooth boundary.

C3—28 to 44 inches; reddish brown (5YR 5/3) silt loam; massive; very friable; common bedding planes; neutral; gradual smooth boundary.

C4—44 to 72 inches; reddish brown (5YR 4/4) silt loam; massive; very friable; common bedding planes; neutral.

Reaction ranges from slightly acid to mildly alkaline in the A horizon and from neutral to moderately alkaline in the C horizon.

The A horizon ranges from 5 to 8 inches thick. It has hue of 5YR, value of 3 or 4, and chroma of 4 or hue of 7.5YR, value of 4, and chroma of 4.

The C horizon has hue of 5YR, value of 4 or 5, and chroma of 3, 4, or 6, or hue of 7.5YR, value of 4 or 5, and chroma of 4 or 6. Texture is very fine sandy loam, silt loam, or loamy very fine sand and is stratified.

### Spadra series

The Spadra series consists of deep, well drained, moderately permeable, level and nearly level soils on

low stream terraces along the larger streams in the uplands. These soils formed in alluvium derived from sandstone and shale. The native vegetation was mixed hardwood trees and pines. Slopes are 0 to 3 percent.

Spadra soils are geographically associated with the Barling and Ceda soils. Barling soils are on similar positions farther from the stream, are moderately well drained, and have a coarse-silty control section. Ceda soils are in slightly lower positions adjacent to the streams, have loamy-skeletal control sections, and do not have an argillic horizon.

Typical pedon of Spadra loam, occasionally flooded, in a pasture in the NE1/4NW1/4NW1/4 sec. 28, T. 9 N., R. 20 W.

- Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) loam; moderate medium granular structure; friable; many fine roots; few fine pores; slightly acid; clear smooth boundary.
- B21t—6 to 14 inches; reddish brown (5YR 4/4) loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; common fine roots; few fine pores; strongly acid; gradual smooth boundary.
- B22t—14 to 22 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; common fine roots; few fine pores; strongly acid; gradual smooth boundary.
- B23t—22 to 37 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots; few fine pores; strongly acid; gradual smooth boundary.
- B24t—37 to 53 inches; brown (7.5YR 4/4) loam; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; few fine roots; few fine pores; few dark organic stains; strongly acid; gradual smooth boundary.
- C1—53 to 68 inches; brown (7.5YR 4/4) fine sandy loam; many coarse distinct yellowish brown (10YR 5/4) mottles; massive; friable; few fine roots; few fine pores; few dark organic stains; strongly acid; gradual smooth boundary.
- C2—68 to 72 inches; brown (7.5YR 4/4) fine sandy loam; many coarse distinct yellowish brown (10YR 5/4) mottles; massive; friable; few fine roots; few fine pores; few dark organic stains; strongly acid.

Solum thickness ranges from 40 to 60 inches.

Reaction ranges from medium acid to very strongly acid throughout unless the surface layer has been limed.

The A horizon ranges from 5 to 10 inches in thickness. It has hue of 10YR, value of 4, and chroma of 3 or 4; or hue of 7.5YR or 5YR, value of 4, and chroma of 4.

The B2t horizon has hue of 5YR with value of 4 and chroma of 4 or 6 or with value of 3 and chroma of 4 or hue of 7.5YR, value of 4, and chroma of 4. Texture is

loam or sandy clay loam. The B3 horizon and C horizon have hues of 5YR and 7.5YR, value of 4, and chroma of 4 or 6. Texture is sandy loam or fine sandy loam.

## Taft series

The Taft series consists of deep, somewhat poorly drained, slowly permeable level to nearly level soils on old stream terraces in valleys. These soils formed in alluvium derived from sandstone and shale. The native vegetation was mixed hardwood trees and some pines. Slopes are 0 to 2 percent.

Taft soils are geographically associated with Cane, Guthrie, and Leadvale soils. Cane and Leadvale soils are on slightly higher positions, are better drained, and have an argillic horizon above the fragipan. Cane soils also have a fine-loamy control section. Guthrie soils are on lower positions and are poorly drained.

Typical pedon of Taft silt loam, 0 to 2 percent slopes, in a meadow in the NE1/4SE1/4NE1/4 sec. 10, T. 7 N., R. 20 W.

- Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; few fine pores; strongly acid; clear smooth boundary.
- A2—6 to 11 inches; brown (10YR 5/3) silt loam; weak fine subangular blocky structure; friable; common fine roots; few fine pores; very strongly acid; clear smooth boundary.
- B2—11 to 19 inches; yellowish brown (10YR 5/4) silt loam; common medium distinct strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; few fine pores; strongly acid; clear smooth boundary.
- A'2—19 to 25 inches; light brownish gray (10YR 6/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; strongly acid; gradual irregular boundary.
- B'x1—25 to 35 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; firm, compact and brittle; common patchy clay films on faces of peds and in pores; few fine roots; common fine pores; gray (10YR 5/1) silt loam tongues 1/2 inch to 5 inches in diameter, 2 to 3 feet apart; common concretions; strongly acid; gradual irregular boundary.
- B'x2—35 to 46 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/4) silty clay loam; common medium prominent reddish brown (2.5YR 5/4) mottles; moderate medium subangular blocky structure; firm, brittle; common patchy clay films on faces of peds and in pores; few fine roots; common fine pores; gray (10YR 6/1) silt loam tongues 1/2 inch to 5 inches in diameter, 2 to 3 feet apart;



common concretions; black stains on ped surfaces and interior; strongly acid; gradual irregular boundary.

B'x3—46 to 56 inches; mottled gray (10YR 5/1) and yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm, compact and brittle; common patchy clay films on faces of peds and in pores; few fine roots; common fine pores; gray (10YR 6/1) silt loam tongues 1/2 inch to 5 inches in diameter, 2 to 3 feet apart; common concretions; black stains on ped surfaces and interior; strongly acid; gradual wavy boundary.

B'21t—56 to 66 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct gray (10YR 5/1) mottles; weak medium subangular blocky structure; firm; common thick clay films in pores; few fine pores; black stains on ped surfaces and interior; strongly acid; gradual wavy boundary.

B'22t—66 to 72 inches; mottled gray (10YR 6/1) and yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; firm; common thick clay films in pores and channels; few fine pores; black stains on ped surfaces and interior; strongly acid.

Solum thickness ranges from 50 to more than 72 inches. Reaction is strongly acid or very strongly acid throughout. Depth to fragipan ranges from 20 to 30 inches. Depth to bedrock ranges from 60 to more than 80 inches.

The A horizon ranges from 5 to 14 inches thick. It has hue of 10YR with value of 4 and chroma of 2 or with value of 5 or 6 and chroma of 3.

The B2 horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. Few to common, fine and medium gray mottles are within 10 inches of the upper boundary of this horizon. Texture is silt loam or silty clay loam.

The A'2 horizon has hue of 10YR, value of 6 or 7, and chroma of 1, 2, or 3. Mottles of brown and gray are common.

The B'x horizon has either mottled patterns of gray, yellowish brown, and brown or has dominant hues of 10YR, value of 5, and chroma of 4, or hue of 2.5YR, value of 5 or 6, chroma of 4 and has few to common, fine and medium brown, yellowish brown, and gray mottles. Texture is silt loam or silty clay loam. The B'2t horizon has the same color range as the B'x horizon. Texture is silty clay loam or silty clay.

### Wrightsville series

The Wrightsville series consists of deep, poorly drained, very slowly permeable, level soils on terraces along the Arkansas River. These soils formed in loamy and clayey alluvium deposited by the Arkansas River. The native vegetation was hardwood trees and tall grasses. Slopes are 0 to 1 percent.

Wrightsville soils are geographically associated with McKamie and Muskogee soils. McKamie soils are on

higher positions, are well drained, and have redder subsoils. Muskogee soils are on slightly higher positions, are moderately well drained, and have a fine-silty control section.

Typical pedon of Wrightsville silt loam, 0 to 1 percent slopes, in hardwood forest in the NE1/4NE1/4NE1/4 sec. 22, T. 7 N., R. 18 W.

O1—1 inch to 0; hardwood leaves and twigs.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; friable; many fine and medium roots; very strongly acid; abrupt smooth boundary.

A2g—2 to 12 inches; light gray (10YR 7/2) silt loam; common fine distinct yellowish brown mottles; weak medium subangular blocky structure; friable; common fine and medium roots; very strongly acid; abrupt irregular boundary.

Bg&Ag—12 to 22 inches; light brownish gray (10YR 6/2) silty clay and tongues of light gray (2.5Y 7.2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; silty clay is weak prismatic parting to moderate medium subangular blocky structure; firm; silt loam is massive; friable; continuous clay films on faces of peds and in pores of silty clay; common fine roots; common fine pores; prisms have silt coatings; very strongly acid; gradual wavy boundary.

B2tg—22 to 37 inches; light brownish gray (10YR 6/2) silty clay; common fine distinct yellowish brown mottles; weak prismatic parting to moderate medium subangular blocky structure; firm, plastic; few fine roots; few fine pores; continuous clay films on faces of peds and in pores; silt coatings on prisms; very strongly acid; gradual wavy boundary.

B3g—37 to 61 inches; light brownish gray (10YR 6/2) silty clay; common medium distinct light olive brown (2.5YR 5/6) mottles; weak medium subangular blocky structure; firm, plastic; few silt pockets; common medium dark concretions; very strongly acid; gradual wavy boundary.

C—61 to 72 inches; mottled light brownish gray (10YR 6/2) and gray (10YR 6/1) silty clay loam; common fine distinct red and olive brown mottles; massive; firm; common medium dark concretions; strongly acid.

Solum thickness ranges from about 50 to 70 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon ranges from 10 to 20 inches thick. The A1 horizon has hue of 10YR, value of 3 to 5, and chroma of 2. The A2 horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Few to common, fine and medium brown mottles are common.

The B horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2. Few to common, fine and medium brown mottles are common.

Texture is silty clay loam, silty clay, or clay. Tongues of silt loam extend to or through the B2t and are 1 to 6 inches wide.

The C horizon has hue of 10YR, value of 5, 6, or 7, and chroma of 1 or 2. Few to common, fine and medium brown mottles are common. Texture is silty clay loam, silty clay or clay.





# formation of the soils

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In this section the factors of soil formation are discussed and related to the soils in the county. In addition, the processes of soil formation are described.

## factors of soil formation

Soil is formed by weathering and other processes that act upon the soil. The characteristics of the soil at any given point depend upon climate, living organisms, parent material, relief and time (5). Each factor acts on the soil and modifies the effect of the other four. When climate, living organisms, or any other one of the five factors is varied to a significant extent, a different soil may form.

Climate and living organisms are the active forces in soil formation. Relief modifies the effects of climate and living organisms, mainly by its influence on temperature and runoff. Because climate, vegetation, parent material, and relief interact over a period of time, time is the fifth factor of soil formation and is reflected in the soil characteristics.

The interaction of the five factors of soil formation is more complex for some soils than for others. The five factors and how they interact to form some of the soils in the county are discussed in the following paragraphs.

### climate

The climate of Pope County is characterized by warm summers, mild winters, and a fairly abundant rainfall. The warm temperatures and high rainfall probably are similar to those under which the soils in the county formed. The average daily temperature in July is about 81 degrees F and in January is about 39 degrees. The total annual rainfall is about 48 inches and is well distributed throughout the year. For additional information about the climate, refer to the section "General nature of the county."

The warm, moist climate promotes rapid soil formation, and the warm temperature encourages rapid chemical reactions. The large amount of water that moves through the soil removes dissolved or suspended materials. Because remains of plants decompose rapidly, the organic acids that form hasten the removal of carbonates and the formation of clay minerals. Because the soil is frozen only to shallow depths and for relatively short periods, soil formation continues almost the year round. The climate throughout the county is relatively uniform, though its effect is modified locally by runoff

and the slope aspect. Climate alone does not account for differences in the soils of the county.

### living organisms

The higher plants and animals, as well as insects, bacteria, fungi, are important in the formation of soils. Among the changes they cause are gains in organic matter and nitrogen in the soil, gains or losses in plant nutrients, and changes in soil structure and porosity.

Before Pope County was settled, the native vegetation had more influence on soil formation than did animal activity. Hardwood forests covered the bottom lands. Bruno, Dardanelle, Moreland, Rilla, Roellen, and Roxana soils formed in these areas. They differ from each other chiefly by parent material and age.

The level and nearly level areas in the broad valleys in the southern part of the county supported a growth of tall bunch grasses and hardwood trees. Guthrie, Leadvale, Muskogee, and Taft soils formed in this area. These soils, however, do not have the thick, dark-colored surface layer commonly associated with soils formed under this type of vegetation. Apparently, their characteristics were influenced more by parent material, climate, and relief than by vegetation.

In the narrow valleys and along the streams in the sloping and hilly parts, mixed pines and hardwoods were native on the deeper soils. Cane, Leadvale, Pickwick, and Spadra soils formed in these areas. These soils differ chiefly in age, relief and degree of weathering.

On the shallower parts, chiefly on low hills, were savannas of scattered stunted hardwoods, cedars, and pines that had an understory of tall grasses. Linker and Mountainburg soils formed here. They differ chiefly in age and degree of weathering.

The native vegetation in most of the mountainous area in the northern part of the county consisted of forests of upland oaks, hickory, redcedar, and shortleaf pine. Only the upper few inches of the soils on these areas have a significant accumulation of organic matter and are dark colored. Enders, Leesburg, and Nella soils formed on these uplands. They differ chiefly in age and degree of weathering, in relief, and in the kind of parent material.

Differences in native vegetation on the uplands appear related mainly to variations in the available water capacity of the soils. On the lowlands, however, the differences appear related mainly to variations in drainage. For example, Moreland and Roellen soils formed in swampy places and have thick dark surface



soils caused by an accumulation of organic debris in the swamps. Adjacent well drained soils do not have dark surface layers. Only the major differences in the original vegetation are reflected by the characteristics of the soils.

Man is important to the future rate and direction of soil formation. He clears the forests, cultivates the soils, and introduces new kinds of plants. He adds fertilizer, lime, and chemicals for insect, disease, and weed control. Building levees and dams for flood control, improving drainage, and grading the soil surface also affect the development of soils. Some results of these changes will not be evident for many centuries. Nevertheless, the complex of living organisms affecting soil formation in this county has been drastically changed by man. Thus, man has become one of the most important organisms affecting soil formation.

#### parent material

The acid sandstones and shales that cover most of Pope County were deposited in marine waters during the Pennsylvanian geologic period. These sedimentary rocks are of various textures. They range from rather coarse-grained sandstones to shaly sandstones and sandy shales to clay shales. There are four different formations—Hale, Atoka, Hartshorne, and McAlester.

The Bloyd and Prairie Grove shale, members of the Hale Formation, are the oldest. The Atoka Formation rests on the Hale Formation and is the most extensive. These formations are composed of inter-bedded shales and thin-bedded sandstones, with shale predominating. The shales weather into materials in which are formed such residual soils as Enders. Where the sandstone caps the ridges, Mountainburg and Linker soils are formed. Nella soils have formed in the colluvium from the sandstone and shale.

The Hartshorne Formation rests on the Atoka Formation in the areas of its occurrence. It is composed of sandstone and sandy shales. It weathers into material from which Mountainburg and Linker soils are formed. The sandstone is generally brown or yellowish brown. In some places, it is almost white. It is medium grained and well cemented; but locally, it is saccharoidal and poorly cemented. The McAlester Formation rests on the Hartshorne Formation. It consists of shale with sandstone lenses. It outcrops on the sides of some of the hills and in some of the valley floors. Where it outcrops on hillsides, Enders soils formed in its weathered material.

Soils on the flood plains of upland drainageways are mainly of Ceda and Spadra series. These soils formed in loamy sediments washed from local uplands.

Soils that have formed on the valley terraces include Cane, Guthrie, Leadvale, Pickwick, and Taft soils. These soils have well developed horizons that formed in loamy local sediments. The soils on benches along the mountainsides formed in friable, loamy, and silty material

that washed or rolled down from above. These are soils of the Leesburg and Nella series. They are deep, medium textured, acid, and well drained. In many places the surface of these soils is stony or gravelly because coarse fragments of sandstone have rolled down from the caprock onto the bluffs.

Soil along the Arkansas River formed in poorly graded, well sorted alluvial sediments deposited by floodwaters. The Bruno soils formed in sandy sediments deposited along or near the river as natural levees. The Moreland and Roellen soils formed in predominantly clayey sediments deposited by slack water on flats and flood bays at places farther from the river. The Dardanelle, Rilla, and Roxana soils formed in the loamy sediments deposited between the areas of sandy sediments and clayey sediments.

#### relief

Relief, or differences in elevation, in Pope County has been brought about chiefly by faulting, folding, and the subsequent entrenchment of drainage channels into the land surface. The highest recorded elevation in the county, about 2,128 feet above sea level, is in the northern part of the county within the boundary of the Ozark National Forest. The lowest elevation, about 300 feet above sea level, is in the southeast part of the county.

Some of the greatest differences in the soils of Pope County are caused by differences in relief through its effect on drainage, runoff, erosion, and percolation of water through the soil. Relief ranges from near vertical bluffs to broad flats.

Generally, the steeper soils and those on narrow ridges are shallow because they have lost so much soil material through geologic erosion. An example is the Mountainburg soils. In contrast, broad areas of the nearly level or gently sloping soils have lost little soil material, and the soils are moderately deep or deep. Examples are Linker and Leadvale soils.

In coves and on foot slopes are deep accumulations of material that washed or slid down from adjoining steep slopes. The Leesburg and Nella soils are in such spots. In places where rocks have broken off and rolled downslope, these soils are stony.

The Guthrie, Taft, and Wrightsville soils are in the level to depressional areas in the broad valleys. Surface drainage is slow or ponded, and the soils are poorly drained and permeability is slow. They are gray or have gray mottles because of the reduction of iron and have a seasonal high or perched water table.

The flood plain of the Arkansas River is level to nearly level and was subject to frequent flooding before flood control dams were built on the river. The floodwater, loaded with soil particles, moved at different speeds, depending partly on the topography. Rapidly moving water deposited the sandy sediment in which the Bruno soils formed. The less rapidly moving water deposited



the mixed sediments that were high in silt and in which the Dardanelle, Rilla, and Roxana soils formed. The slack or still water trapped in flood bays and on broad flats deposited the clayey sediments in which the Moreland and Roellen soils formed.

## time

The time required for soil formation depends largely on other factors of soil formation. Less time generally is required if the climate is warm and humid and the vegetation luxuriant. If other factors are equal, less time is also required if the parent material is loamy than if it is clayey.

In terms of geological time, most of the soils of Pope County are old regardless of whether they are on mountaintops, mountainsides, or stream terraces. The young soils formed in alluvium along streams.

Some of the soils on the uplands are examples of old soils. They formed in material weathered from sandstone, rocks, and shale of Pennsylvanian Age. Most are old enough that nearly all of the cations have been leached out, the reaction is strongly acid or very strongly acid, there has been considerable weathering and translocation of clay, and the horizons are clearly expressed. Iron as well as clay has been translocated from the A horizon to the B horizon and then oxidized, causing the B horizon to have stronger red, brown, and yellow colors than the A horizon. Enders and Linker soils clearly show the impact of time, acting with other soil-forming factors, on parent material.

The Bruno and Roxana soils are examples of young soils. They formed in recent alluvium on the flood plains of the Arkansas River. No definite horizons have formed below the A horizon. Instead, these soils still have the depositional rock structure, or bedding planes, and little or no soil structure. Base saturation is high, and the reaction is slightly acid to moderately alkaline, which indicates that leaching has been slight. Except for the slight mechanical changes caused by worms and roots, there is little evidence of soil-forming activity.

## processes of soil formation

In this subsection a brief definition of the horizon nomenclature and processes responsible for soil formation are given.

The marks that the soil-forming factors leave on the soil are recorded in the soil profile, which is a succession of layers, or horizons, from the surface to the parent rock. The horizons differ in one or more properties such as color, texture, structure, consistency, and porosity.

Most soil profiles contain three major horizons called A, B, and C. Very young soils do not have a B horizon.

The A horizon can be the horizon of maximum accumulation of organic matter called the A1 horizon or the surface layer, or it can be the horizon of maximum leaching of dissolved or suspended materials called the A2 or subsurface layer.

The B horizon is immediately below the A horizon and is sometimes called the subsoil. It is a horizon of maximum accumulation of suspended materials such as clay and iron. The B horizon commonly has blocky structure and is firmer than the horizons immediately above and below it (9).

Beneath the B horizon is the C horizon. It has not been affected much by the soil-forming processes, but the C horizon can be materially modified by weathering. In some young soils, the C horizon immediately underlies the A horizon and has been slightly modified by living organisms as well as by weathering.

Several processes have been active in the formation of soil horizons in Pope County. Among these processes are (1) the accumulation of organic matter, (2) the leaching of bases, (3) the oxidation or reduction and transfer of iron, and (4) formation and translocation of silicate clay minerals. In most of the soils of the county, more than one of these processes has been active in soil formation.

Physical weathering of rocks, through heating and cooling and wetting and drying, slowly breaks them into small pieces. These pieces form the parent material for the residual soils in the county. This is most evident in Linker and Mountainburg soils.

Accumulation of organic matter in the upper part of the profile to form an A1 horizon has been an important process of soil formation.

Leaching of bases has occurred to some degree in nearly all of the soils of Pope County. Among soil scientists it is generally accepted that bases are leached downward in soils before silicate clay minerals begin to move. Most of the soils in the county are moderately leached, an important factor in horizon development. Some such as Bruno and Roxana soils are only slightly leached. Others such as Enders, Linker, and Mountainburg soils are strongly leached.

Oxidation of iron is evident in the moderately well drained and well drained soils in the county. Oxidation of iron is indicated by the red and brown colors in the B horizon of such soils as Linker, Mountainburg, and Enders soils on uplands and Leadvale soils in valleys.

Reduction and transfer of iron has occurred to a significant degree in the poorly drained and somewhat poorly drained soils of the lowlands. In the naturally wet soils, this process is called gleying. Gray colors in the horizons below the surface indicate the reduction and loss of iron. Some horizons contain reddish or yellowish mottles and concretions derived from segregated iron. Gleying is most pronounced in the Guthrie, Roellen, and Wrightsville soils.

Translocation of silicate clay minerals has contributed to horizon development in most of the soils in the county. In cultivated areas most of the eluviated A2 horizon has been destroyed; but where it occurs, the structure is usually weak subangular blocky, clay content is less than in the lower horizons where it has



accumulated, and the horizon is lighter in color. Clay films generally have accumulated in pores and on the surface of peds in the B horizon. The soils were probably leached of carbonates and soluble salts to a great extent before translocation of silicate clay occurred, even

though the content of bases is still high in some of the soils on lowlands.

Leaching of bases and translocation of silicate clay are among the most important processes in horizon differentiation in the soils of Pope County.

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# glossary

**ABC soil.** A soil having an A, a B, and a C horizon.

**AC soil.** A soil having only an A and a C horizon.

Commonly such soil formed in recent alluvium or on steep rocky slopes.

**Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

**Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Area reclaim** (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

**Association, soil.** A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

**Available water capacity (available moisture capacity).** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

|                | <i>Inches</i> |
|----------------|---------------|
| Very low.....  | 0 to 3        |
| Low.....       | 3 to 6        |
| Moderate.....  | 6 to 9        |
| High.....      | 9 to 12       |
| Very high..... | More than 12  |

**Base saturation.** The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

**Bedding planes.** Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

**Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

**Bisequum.** Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

**Bottom land.** The normal flood plain of a stream, subject to flooding.

**Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

**Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

**Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

**Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

**Clay film.** A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

**Coarse fragments.** If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

**Coarse textured soil.** Sand or loamy sand.

**Colluvium.** Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

**Complex slope.** Irregular or variable slope. Planning or constructing terraces, diversions, and other water controls on such slopes is difficult.

**Complex, soil.** A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

**Concretions.** Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.



**Consistence, soil.** The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—  
*Loose.*—Noncoherent when dry or moist; does not hold together in a mass.

*Friable.*—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

*Firm.*—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

*Plastic.*—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

*Sticky.*—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

*Hard.*—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

*Soft.*—When dry, breaks into powder or individual grains under very slight pressure.

*Cemented.*—Hard; little affected by moistening.

**Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

**Corrosive.** High risk of corrosion to uncoated steel or deterioration of concrete.

**Cover crop.** A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

**Cutbanks cave** (in tables). The walls of excavations tend to cave in or slough.

**Depth to rock** (in tables). Bedrock is too near the surface for the specified use.

**Drainage class** (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained.*—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

*Somewhat excessively drained.*—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

*Well drained.*—Water is removed from the soil readily, but not rapidly. It is available to plants

throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

*Moderately well drained.*—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

*Somewhat poorly drained.*—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

*Poorly drained.*—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

*Very poorly drained.*—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

**Drainage, surface.** Runoff, or surface flow of water, from an area.

**Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

*Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

**Excess fines** (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

**Fast intake** (in tables). The rapid movement of water into the soil.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.

**Fine textured soil.** Sandy clay, silty clay, and clay.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Foot slope.** The inclined surface at the base of a hill.

**Fragipan.** A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

**Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

**Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

**Gravel.** Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

**Ground water** (geology). Water filling all the unblocked pores of underlying material below the water table.

**Gully.** A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

**Horizon, soil.** A layer of soil, approximately parallel to the surface, having distinct characteristics produced

by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

*O horizon.*—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

*A horizon.*—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*B horizon.*—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

*R layer.*—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

**Hydrologic soil groups.** Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

**Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.



**Impervious soil.** A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

**Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

**Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

**Intake rate.** The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

|                    |                 |
|--------------------|-----------------|
| Less than 0.2..... | very low        |
| 0.2 to 0.4.....    | low             |
| 0.4 to 0.75.....   | moderately low  |
| 0.75 to 1.25.....  | moderate        |
| 1.25 to 1.75.....  | moderately high |
| 1.75 to 2.5.....   | high            |
| More than 2.5..... | very high       |

**Large stones** (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Loess.** Fine grained material, dominantly of silt-sized particles, deposited by wind.

**Low strength.** The soil is not strong enough to support loads.

**Medium textured soil.** Very fine sandy loam, loam, silt loam, or silt.

**Moderately coarse textured soil.** Sandy loam and fine sandy loam.

**Moderately fine textured soil.** Clay loam, sandy clay loam, and silty clay loam.

**Morphology, soil.** The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size

measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

**Munsell notation.** A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

**Neutral soil.** A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition.

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The downward movement of water through the soil.

**Percs slowly** (in tables). The slow movement of water through the soil adversely affecting the specified use.

**Permeability.** The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

|                       |                        |
|-----------------------|------------------------|
| Very slow.....        | less than 0.06 inch    |
| Slow.....             | 0.06 to 0.20 inch      |
| Moderately slow.....  | 0.2 to 0.6 inch        |
| Moderate.....         | 0.6 inch to 2.0 inches |
| Moderately rapid..... | 2.0 to 6.0 inches      |
| Rapid.....            | 6.0 to 20 inches       |
| Very rapid.....       | more than 20 inches    |

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

**pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

**Piping** (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

**Plasticity index.** The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Ponding.** Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

**Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

|                             | pH             |
|-----------------------------|----------------|
| Extremely acid.....         | Below 4.5      |
| Very strongly acid.....     | 4.5 to 5.0     |
| Strongly acid.....          | 5.1 to 5.5     |
| Medium acid.....            | 5.6 to 6.0     |
| Slightly acid.....          | 6.1 to 6.5     |
| Neutral.....                | 6.6 to 7.3     |
| Mildly alkaline.....        | 7.4 to 7.8     |
| Moderately alkaline.....    | 7.9 to 8.4     |
| Strongly alkaline.....      | 8.5 to 9.0     |
| Very strongly alkaline..... | 9.1 and higher |

**Regolith.** The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

**Residuum (residual soil material).** Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Rooting depth** (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

**Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

**Sandstone.** Sedimentary rock containing dominantly sand-size particles.

**Seepage** (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

**Sequum.** A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Shale.** Sedimentary rock formed by the hardening of a clay deposit.

**Shrink-swell.** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

**Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

**Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.

**Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

**Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

**Slow refill** (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

**Small stones** (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

**Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

**Soil separates.** Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

|                       | Millime-<br>ters |
|-----------------------|------------------|
| Very coarse sand..... | 2.0 to 1.0       |
| Coarse sand.....      | 1.0 to 0.5       |
| Medium sand.....      | 0.5 to 0.25      |
| Fine sand.....        | 0.25 to 0.10     |
| Very fine sand.....   | 0.10 to 0.05     |
| Silt.....             | 0.05 to 0.002    |
| Clay.....             | less than 0.002  |



**Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

**Stony.** Soil contains stones in quantity that interferes with or prevents tillage.

**Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.

**Substratum.** The part of the soil below the solum.

**Subsurface layer.** Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

**Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

**Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

**Terrace** (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

**Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*,

*silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

**Thin layer** (in tables). Otherwise suitable soil material too thin for the specified use.

**Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

**Toe slope.** The outermost inclined surface at the base of a hill; part of a foot slope.

**Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

**Upland** (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

**Valley fill.** In glaciated regions, material deposited in stream valleys by glacial melt water. In nonglaciated regions, alluvium deposited by heavily loaded streams.

**Variant, soil.** A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

**Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

**Well graded.** Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

**Wilting point (or permanent wilting point).** The moisture content of soil, on an oven-dry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

**tables**

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TABLE 1.--ACREAGE OF PRINCIPAL CROPS AND PASTURE

| Crops and pasture                   | 1969   | 1974   |
|-------------------------------------|--------|--------|
| Cropland pastured                   | 57,179 | 51,238 |
| Woodland, including wooded pasture* | 54,128 | 61,747 |
| Hay crops                           | 13,400 | 17,120 |
| Soybeans                            | 13,996 | 13,518 |
| Cotton                              | 1,047  | 170    |
| Field Corn                          | 357    | 415    |
| Wheat                               | 575    | 790    |
| Truck crops (including potatoes)    | 459    | 145    |
| Orchards and vineyards              | 477    | 196    |

\* The 1974 Census of Agriculture and observations during the field work for this survey indicate that most of the woodland was pastured.

TABLE 2.--NUMBER OF LIVESTOCK AND POULTRY

| Livestock and poultry                             | 1969       | 1974       |
|---|------------|------------|
| All cattle and calves on farms and sold           | 40,067     | 51,059     |
| Milk cows   | 931        | 989        |
| Hogs on farms and sold                            | 14,360     | 34,262     |
| Chickens more than 3 months old on farms and sold | 2,305,796  | 1,899,700  |
| Broilers sold                                     | 11,217,219 | 12,599,256 |

TABLE 3.--TEMPERATURE AND PRECIPITATION  
[Recorded 1951-77 at Russellville, Ark.]

| Month        | Temperature                 |                             |                  |  |   |  | Precipitation |                              |                |   |                     |
|--------------|-----------------------------|-----------------------------|------------------|--|---|--|---------------|------------------------------|----------------|---|---------------------|
|              | Average<br>daily<br>maximum | Average<br>daily<br>minimum | Average<br>daily | 2 years in<br>10 will have--               |   | Average<br>number of<br>growing<br>degree<br>days* | Average       | 2 years in 10<br>will have-- |                | Average<br>number of<br>days with<br>0.10 inch<br>or more | Average<br>snowfall |
|              |                             |                             |                  | Maximum<br>temperature<br>higher<br>than-- | Minimum<br>temperature<br>lower<br>than-- |  |               | Less<br>than--               | More<br>than-- |   |                     |
|              | <u>°F</u>                   | <u>°F</u>                   | <u>°F</u>        | <u>°F</u>                                  | <u>°F</u>                                 | <u>Units</u>                                       | <u>In</u>     | <u>In</u>                    | <u>In</u>      |   | <u>In</u>           |
| January----  | 51.2                        | 27.3                        | 39.3             | 76   | 5   | 23   | 2.98          | 1.15                         | 4.45           | 5   | 1.3                 |
| February---- | 56.7                        | 31.5                        | 44.1             | 78   | 9   | 41   | 3.43          | 1.86                         | 4.71           | 6   | .5                  |
| March-----   | 64.2                        | 38.2                        | 51.3             | 86   | 17  | 154  | 4.97          | 2.44                         | 7.03           | 7   | .3                  |
| April-----   | 75.1                        | 48.4                        | 61.7             | 90   | 28  | 351  | 4.82          | 2.51                         | 6.70           | 7   | .0                  |
| May-----     | 82.7                        | 57.0                        | 69.9             | 94   | 38  | 617  | 5.12          | 2.53                         | 7.23           | 7   | .0                  |
| June-----    | 89.6                        | 64.8                        | 77.3             | 101  | 49  | 819  | 4.42          | 1.71                         | 6.60           | 6   | .0                  |
| July-----    | 93.4                        | 69.1                        | 81.3             | 103  | 55  | 970  | 3.53          | 1.43                         | 5.23           | 6   | .0                  |
| August-----  | 93.0                        | 67.4                        | 80.2             | 103  | 54  | 936  | 3.55          | 1.54                         | 5.17           | 5   | .0                  |
| September--  | 86.2                        | 60.3                        | 73.3             | 100  | 41  | 699  | 4.06          | 2.03                         | 5.72           | 5   | .0                  |
| October----  | 76.7                        | 47.9                        | 62.3             | 94   | 28  | 390  | 3.47          | .97                          | 5.46           | 5   | .0                  |
| November---  | 63.1                        | 37.6                        | 50.4             | 82   | 15  | 95   | 4.26          | 2.04                         | 6.07           | 5   | .4                  |
| December---  | 53.3                        | 30.3                        | 41.8             | 75   | 9   | 17   | 3.64          | 1.71                         | 5.21           | 5   | .4                  |
| Yearly:      |                             |                             |                  |  |   |  |               |                              |                |   |                     |
| Average--    | 73.8                        | 48.3                        | 61.1             | ---  | ---                                       | ---  | ---           | ---                          | ---            | ---   | ---                 |
| Extreme--    | ---                         | ---                         | ---              | 106  | 2   | ---  | ---           | ---                          | ---            | ---   | ---                 |
| Total----    | ---                         | ---                         | ---              | ---  | ---                                       | 5,112  | 48.25         | 40.35                        | 56.70          | 69  | 2.9                 |

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).



TABLE 4.--FREEZE DATES IN SPRING AND FALL  
[Recorded 1951-77 at Russellville, Ark.]

| Probability                                | Temperature       |                   |                   |
|--|-------------------|-------------------|-------------------|
|  | 24° F<br>or lower | 28° F<br>or lower | 32° F<br>or lower |
| Last freezing<br>temperature<br>in spring: |                   |                   |                   |
| 1 year in 10<br>later than--               | March 26          | April 6           | April 17          |
| 2 years in 10<br>later than--              | March 19          | April 1           | April 13          |
| 5 years in 10<br>later than--              | March 5           | March 22          | April 6           |
| First freezing<br>temperature<br>in fall:  |                   |                   |                   |
| 1 year in 10<br>earlier than--             | October 28        | October 24        | October 17        |
| 2 years in 10<br>earlier than--            | November 4        | October 29        | October 21        |
| 5 years in 10<br>earlier than--            | November 17       | November 7        | October 29        |

TABLE 5.--GROWING SEASON  
[Recorded 1951-77 at Russellville, Ark.]

| Probability   | Daily minimum temperature<br>during growing season |                         |                         |
|---------------|--|-------------------------|-------------------------|
|               | Higher<br>than<br>24° F                            | Higher<br>than<br>28° F | Higher<br>than<br>32° F |
|               | Days   | Days                    | Days                    |
| 9 years in 10 | 228  | 209                     | 189                     |
| 5 years in 10 | 256  | 229                     | 206                     |
| 2 years in 10 | 275  | 243                     | 217                     |
| 1 year in 10  | 285  | 250                     | 223                     |

TABLE 6.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

| Map<br>symbol | Soil name  | Acres   | Percent |
|---------------|--|---------|---------|
| 1             | Barling silt loam, occasionally flooded-----                       | 2,550   | 0.5     |
| 2             | Bruno loamy fine sand, 0 to 3 percent slopes-----                  | 3,310   | 0.6     |
| 3             | Bruno loamy fine sand, occasionally flooded-----                   | 2,815   | 0.5     |
| 4             | Cane loam, 3 to 8 percent slopes-----                              | 7,350   | 1.4     |
| 5             | Dardanelle silt loam, 0 to 1 percent slopes-----                   | 970     | 0.2     |
| 6             | Dardanelle silt loam, gently undulating-----                       | 1,635   | 0.3     |
| 7             | Enders gravelly fine sandy loam, 3 to 8 percent slopes-----        | 3,045   | 0.6     |
| 8             | Enders gravelly fine sandy loam, 8 to 12 percent slopes-----       | 5,570   | 1.1     |
| 9             | Enders stony fine sandy loam, 12 to 45 percent slopes-----         | 16,665  | 3.2     |
| 10            | Enders-Mountainburg association, rolling-----                      | 9,790   | 1.9     |
| 11            | Enders-Mountainburg association, steep-----                        | 20,220  | 3.8     |
| 12            | Guthrie silt loam, 0 to 1 percent slopes-----                      | 3,960   | 0.8     |
| 13            | Leadvale silt loam, 1 to 3 percent slopes-----                     | 24,895  | 4.7     |
| 14            | Leadvale silt loam, 3 to 8 percent slopes-----                     | 5,165   | 1.0     |
| 15            | Leesburg-Enders association, steep-----                            | 1,940   | 0.4     |
| 16            | Linker fine sandy loam, 1 to 3 percent slopes-----                 | 970     | 0.2     |
| 17            | Linker fine sandy loam, 3 to 8 percent slopes-----                 | 69,085  | 12.9    |
| 18            | Linker fine sandy loam, 8 to 12 percent slopes-----                | 1,165   | 0.2     |
| 19            | Linker-Mountainburg association, gently rolling-----               | 8,695   | 1.7     |
| 20            | Linker-Mountainburg association, rolling-----                      | 6,015   | 1.1     |
| 21            | McKamie very fine sandy loam, 3 to 8 percent slopes-----           | 2,105   | 0.4     |
| 22            | Moreland silty clay, 0 to 1 percent slopes-----                    | 855     | 0.2     |
| 23            | Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes-----  | 53,380  | 10.1    |
| 24            | Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes----- | 8,370   | 1.6     |
| 25            | Mountainburg stony fine sandy loam, 1 to 12 percent slopes-----    | 22,740  | 4.3     |
| 26            | Mountainburg stony fine sandy loam, 12 to 40 percent slopes-----   | 22,645  | 4.3     |
| 27            | Muskogee silt loam, 1 to 3 percent slopes-----                     | 1,585   | 0.3     |
| 28            | Muskogee silt loam, 3 to 8 percent slopes-----                     | 1,000   | 0.2     |
| 29            | Nella gravelly fine sandy loam, 3 to 8 percent slopes-----         | 5,530   | 1.1     |
| 30            | Nella gravelly fine sandy loam, 8 to 12 percent slopes-----        | 3,960   | 0.8     |
| 31            | Nella gravelly fine sandy loam, 12 to 20 percent slopes-----       | 6,660   | 1.3     |
| 32            | Nella-Enders association, rolling-----                             | 12,830  | 2.4     |
| 33            | Nella-Enders association, steep-----                               | 34,025  | 6.5     |
| 34            | Nella-Enders-Mountainburg association, very steep-----             | 54,640  | 10.4    |
| 35            | Nella-Mountainburg association, rolling-----                       | 12,555  | 2.4     |
| 36            | Nella-Mountainburg association, steep-----                         | 29,140  | 5.5     |
| 37            | Pickwick silt loam, 1 to 3 percent slopes-----                     | 1,295   | 0.2     |
| 38            | Pickwick silt loam, 3 to 8 percent slopes-----                     | 5,750   | 1.1     |
| 39            | Rilla silt loam, 0 to 2 percent slopes-----                        | 2,500   | 0.5     |
| 40            | Roellen clay, 0 to 1 percent slopes-----                           | 3,320   | 0.6     |
| 41            | Roellen clay, occasionally flooded-----                            | 1,545   | 0.3     |
| 42            | Roxana silt loam, 0 to 1 percent slopes-----                       | 2,975   | 0.6     |
| 43            | Roxana silt loam, occasionally flooded-----                        | 1,380   | 0.3     |
| 44            | Spadra loam, occasionally flooded-----                             | 20,930  | 4.0     |
| 45            | Spadra-Ceda association, occasionally flooded-----                 | 2,870   | 0.5     |
| 46            | Taft silt loam, 0 to 2 percent slopes-----                         | 6,290   | 1.2     |
| 47            | Udorthents, loamy-----   | 320     | 0.1     |
| 48            | Wrightsville silt loam, 0 to 1 percent slopes-----                 | 1,720   | 0.3     |
|               | Small water*-----  | 1,085   | 0.2     |
|               | Large water**-----   | 6,270   | 1.2     |
|               | Total-----   | 526,080 | 100.0   |

\* Enclosed areas of water less than 40 acres, and streams, sloughs, and canals less than one-eighth of a statute mile in width.

\*\* Enclosed areas of water more than 40 acres, and streams, sloughs, and canals more than one-eighth of a statute mile in width.



TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

| Map symbol and<br>soil name | Soybeans | Wheat | Rice | Tall<br>fescue | Bahiagrass | Improved<br>bermuda-<br>grass | Common<br>bermuda-<br>grass |
|-----------------------------|----------|-------|------|----------------|------------|-------------------------------|-----------------------------|
|                             | Bu       | Bu    | Bu   | AUM*           | AUM*       | AUM*                          | AUM*                        |
| 1-----<br>Barling           | 35       | 40    | ---  | 9              | ---        | 12.0                          | 8.0                         |
| 2**-----<br>Bruno           | 20       | 25    | ---  | ---            | ---        | 6.0                           | 5.0                         |
| 3-----<br>Bruno             | 20       | 25    | ---  | ---            | ---        | 6.0                           | 5.0                         |
| 4-----<br>Cane              | 25       | 30    | ---  | 7.0            | 8.0        | 10.0                          | 7.0                         |
| 5, 6-----<br>Dardanelle     | 40       | 40    | ---  | 7.5            | ---        | 13.0                          | 8.0                         |
| 7-----<br>Enders            | ---      | 25    | ---  | 5.0            | 5.5        | ---                           | 5.0                         |
| 8-----<br>Enders            | ---      | ---   | ---  | 4.0            | ---        | ---                           | 4.0                         |
| 9-----<br>Enders            | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 10:***<br>Enders-----       | ---      | ---   | ---  | 4.0            | ---        | ---                           | 4.0                         |
| Mountainburg-----           | ---      | ---   | ---  | 3.0            | ---        | ---                           | 3.0                         |
| 11:***<br>Enders-----       | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| Mountainburg-----           | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 12-----<br>Guthrie          | 20       | 20    | ---  | 6.0            | 6.0        | ---                           | 6.0                         |
| 13-----<br>Leadvale         | 30       | 35    | ---  | 7.0            | 7.5        | 9.0                           | 7.0                         |
| 14-----<br>Leadvale         | 25       | 30    | ---  | 6.5            | 7.0        | 8.0                           | 6.5                         |
| 15:***<br>Leesburg-----     | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| Enders-----                 | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 16-----<br>Linker           | 20       | 30    | ---  | 5.5            | 6.5        | 8.5                           | 6.0                         |
| 17-----<br>Linker           | 15       | 25    | ---  | 5.0            | 6.0        | 8.0                           | 5.5                         |
| 18-----<br>Linker           | ---      | 25    | ---  | 4.0            | 5.5        | 7.5                           | 5.0                         |
| 19:***<br>Linker-----       | 15       | 25    | ---  | 5.0            | 6.0        | 8.0                           | 5.5                         |
| Mountainburg-----           | ---      | 15    | ---  | 4.0            | 5.0        | ---                           | 4.0                         |
| 20:***<br>Linker-----       | ---      | ---   | ---  | 4.0            | 5.0        | 7.0                           | 4.5                         |

See footnotes at end of table.

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

| Map symbol and<br>soil name | Soybeans | Wheat | Rice | Tall<br>fescue | Bahiagrass | Improved<br>bermuda-<br>grass | Common<br>bermuda-<br>grass |
|-----------------------------|----------|-------|------|----------------|------------|-------------------------------|-----------------------------|
|                             | Bu       | Bu    | Bu   | AUM*           | AUM*       | AUM*                          | AUM*                        |
| 20:***<br>Mountainburg----- | ---      | ---   | ---  | ---            | 4.0        | ---                           | 3.0                         |
| 21-----<br>McKamie          | 20       | ---   | ---  | 5.5            | 5.5        | ---                           | 5.0                         |
| 22-----<br>Moreland         | 35       | ---   | 130  | 8.5            | ---        | 10.0                          | 6.0                         |
| 23-----<br>Mountainburg     | ---      | 15    | ---  | 4.0            | 5.0        | ---                           | 4.0                         |
| 24-----<br>Mountainburg     | ---      | ---   | ---  | ---            | 4.5        | ---                           | 4.0                         |
| 25-----<br>Mountainburg     | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 26-----<br>Mountainburg     | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 27-----<br>Muskogee         | 25       | 30    | ---  | 6.5            | 7.5        | 10.0                          | 7.0                         |
| 28-----<br>Muskogee         | 20       | 25    | ---  | 6.0            | 7.5        | 10.0                          | 7.0                         |
| 29-----<br>Nella            | ---      | 30    | ---  | 7.5            | 5.0        | 9.5                           | 6.5                         |
| 30-----<br>Nella            | ---      | 30    | ---  | 7.0            | 4.5        | 9.0                           | 6.0                         |
| 31-----<br>Nella            | ---      | ---   | ---  | 6.0            | 4.0        | ---                           | 5.0                         |
| 32:***<br>Nella-----        | ---      | ---   | ---  | 6.0            | 4.0        | ---                           | 5.0                         |
| Enders-----                 | ---      | ---   | ---  | 5.0            | ---        | ---                           | 4.0                         |
| 33:***<br>Nella-----        | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| Enders-----                 | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 34:***<br>Nella-----        | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| Enders-----                 | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| Mountainburg-----           | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 35:***<br>Nella-----        | ---      | ---   | ---  | 6.0            | 4.0        | ---                           | 5.0                         |
| Mountainburg-----           | ---      | ---   | ---  | ---            | 4.0        | ---                           | 3.0                         |
| 36:***<br>Nella-----        | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| Mountainburg-----           | ---      | ---   | ---  | ---            | ---        | ---                           | ---                         |
| 37-----<br>Pickwick         | 30       | 35    | ---  | 6.0            | 7.5        | 10.5                          | 7.0                         |
| 38-----<br>Pickwick         | 25       | 35    | ---  | 6.0            | 7.0        | 10.0                          | 6.5                         |

See footnotes at end of table.



TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

| Map symbol and<br>soil name | Soybeans  | Wheat     | Rice      | Tall<br>fescue | Bahiagrass  | Improved<br>bermuda-<br>grass | Common<br>bermuda-<br>grass |
|-----------------------------|-----------|-----------|-----------|----------------|-------------|-------------------------------|-----------------------------|
|                             | <u>Bu</u> | <u>Bu</u> | <u>Bu</u> | <u>AUM*</u>    | <u>AUM*</u> | <u>AUM*</u>                   | <u>AUM*</u>                 |
| 39-----<br>Rilla            | 35        | 40        | ---       | ---            | ---         | 13.0                          | 7.0                         |
| 40, 41-----<br>Roellen      | 35        | 25        | 120       | 7.0            | ---         | ---                           | 6.0                         |
| 42-----<br>Roxana           | 35        | 40        | ---       | 7.5            | ---         | 13.0                          | 8.5                         |
| 43-----<br>Roxana           | 35        | 40        | ---       | 7.5            | ---         | 13.0                          | 8.5                         |
| 44-----<br>Spadra           | 30        | 25        | ---       | 8.5            | ---         | 13.0                          | 7.5                         |
| 45:***<br>Spadra-----       | ---       | ---       | ---       | 8.5            | ---         | 13.0                          | 7.5                         |
| Ceda-----                   | ---       | ---       | ---       | 4.0            | ---         | 5.0                           | 3.0                         |
| 46-----<br>Taft             | 25        | 25        | ---       | 6.0            | 6.0         | ---                           | 6.0                         |
| 47:***<br>Udorthents-----   | ---       | ---       | ---       | ---            | ---         | ---                           | ---                         |
| 48-----<br>Wrightsville     | 20        | 25        | ---       | 5.0            | 7.5         | ---                           | 7.0                         |

\* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

\*\* Yields are for areas protected from flooding.

\*\*\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

| Map symbol and soil name | Wood-land suitability group | Management concerns |                       |                    | Potential productivity  |                                | Trees to plant  |
|--------------------------|-----------------------------|---------------------|-----------------------|--------------------|---|--------------------------------|---|
|                          |                             | Erosion hazard      | Equip-ment limitation | Seedling mortality | Common trees  | Site index                     |   |
| 1-----<br>Barling        | 2o7                         | Slight              | Slight                | Slight             | Southern red oak-----<br>Sweetgum-----<br>Eastern cottonwood-----<br>Shortleaf pine-----                    | 80<br>90<br>96<br>80           | Eastern cottonwood,<br>American sycamore,<br>shortleaf pine,<br>loblolly pine,<br>sweetgum, green ash,<br>Shumard oak,<br>cherrybark oak. |
| 2, 3-----<br>Bruno       | 2s5                         | Slight              | Moderate              | Moderate           | Eastern cottonwood-----<br>American sycamore-----<br>Water oak-----<br>Sweetgum-----                        | 105<br>90<br>95<br>90          | Cherrybark oak,<br>willow oak, water oak,<br>sweetgum, American<br>sycamore, eastern<br>cottonwood.                                       |
| 4-----<br>Cane           | 3o7                         | Slight              | Slight                | Slight             | Sweetgum-----<br>Loblolly pine-----<br>Shortleaf pine-----  | 80<br>80<br>70                 | Loblolly pine,<br>shortleaf pine.   |
| 5, 6-----<br>Dardanelle  | 1o4                         | Slight              | Slight                | Slight             | Green ash-----<br>Eastern cottonwood-----<br>Cherrybark oak-----<br>Sweetgum-----<br>American sycamore----- | 75<br>106<br>100<br>100<br>--- | Eastern cottonwood,<br>sweetgum, American<br>sycamore, black<br>walnut.   |
| 7, 8-----<br>Enders      | 4o1                         | Slight              | Slight                | Slight             | Shortleaf pine-----<br>Southern red oak-----<br>White oak-----<br>Northern red oak-----                     | 60<br>60<br>55<br>60           | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.  |
| 9-----<br>Enders         | 5r3                         | Moderate            | Severe                | Moderate           | Southern red oak-----<br>White oak-----<br>Eastern redcedar-----<br>Shortleaf pine-----                     | 50<br>50<br>35<br>50           | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.  |
| 10:*<br>Enders-----      | 4o1                         | Slight              | Slight                | Slight             | Shortleaf pine-----<br>Southern red oak-----<br>White oak-----<br>Northern red oak-----                     | 60<br>60<br>55<br>60           | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.  |
| Mountainburg-----        | 5x3                         | Moderate            | Severe                | Moderate           | Shortleaf pine-----<br>Eastern redcedar-----<br>Loblolly pine-----  | 50<br>30<br>---                | Shortleaf pine,<br>eastern redcedar,<br>loblolly pine.  |
| 11:*<br>Enders-----      | 5r3                         | Severe              | Severe                | Moderate           | Southern red oak-----<br>White oak-----<br>Eastern redcedar-----<br>Shortleaf pine-----                     | 50<br>50<br>35<br>50           | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.  |
| Mountainburg-----        | 5x3                         | Severe              | Severe                | Moderate           | Shortleaf pine-----<br>Eastern redcedar-----<br>Loblolly pine-----  | 50<br>30<br>---                | Shortleaf pine,<br>eastern redcedar,<br>loblolly pine.  |
| 12-----<br>Guthrie       | 2w9                         | Slight              | Severe                | Severe             | Southern red oak-----<br>Loblolly pine-----<br>Willow oak-----<br>Sweetgum-----<br>Water oak-----           | 75<br>80<br>85<br>90<br>70     | Loblolly pine,<br>sweetgum,<br>water oak.   |
| 13, 14-----<br>Leadvale  | 3o7                         | Slight              | Slight                | Slight             | White oak-----<br>Loblolly pine-----<br>Shortleaf pine-----<br>Eastern redcedar-----                        | 70<br>80<br>70<br>---          | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.  |

See footnote at end of table.



TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Map symbol and soil name | Wood-land suitability group | Management concerns |                        |                     | Potential productivity  |            | Trees to plant                                   |
|--------------------------|-----------------------------|---------------------|------------------------|---------------------|-------------------------|------------|--|
|                          |                             | Erosion hazard      | Equip-ment limita-tion | Seedling mortal-ity | Common trees            | Site index |  |
| 15:*                     |                             |                     |                        |                     |                         |            |  |
| Leesburg-----            | 3r9                         | Severe              | Severe                 | Slight              | White oak-----          | 70         | Loblolly pine, shortleaf pine.                   |
|                          |                             |                     |                        |                     | Shortleaf pine-----     | 70         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | 80         |  |
|                          |                             |                     |                        |                     | Northern redoak-----    | ---        |  |
| Enders-----              | 5r3                         | Severe              | Severe                 | Moderate            | Southern red oak-----   | 50         | Loblolly pine, shortleaf pine, eastern redcedar. |
|                          |                             |                     |                        |                     | White oak-----          | 50         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 35         |  |
|                          |                             |                     |                        |                     | Shortleaf pine-----     | 50         |  |
| 16, 17, 18-----          | 4o1                         | Slight              | Slight                 | Slight              | Shortleaf pine-----     | 60         | Shortleaf pine, loblolly pine, eastern redcedar. |
| Linker                   |                             |                     |                        |                     | Southern red oak-----   | 50         |  |
|                          |                             |                     |                        |                     | White oak-----          | 50         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 40         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| 19:*                     |                             |                     |                        |                     |                         |            |  |
| Linker-----              | 4o1                         | Slight              | Slight                 | Slight              | Shortleaf pine-----     | 60         | Shortleaf pine, loblolly pine, eastern redcedar. |
|                          |                             |                     |                        |                     | Southern red oak-----   | 50         |  |
|                          |                             |                     |                        |                     | White oak-----          | 50         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 40         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| Mountainburg-----        | 5d2                         | Slight              | Slight                 | Moderate            | Shortleaf pine-----     | 50         | Shortleaf pine, eastern redcedar, loblolly pine. |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 30         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| 20:*                     |                             |                     |                        |                     |                         |            |  |
| Linker-----              | 4o1                         | Slight              | Slight                 | Slight              | Shortleaf pine-----     | 60         | Shortleaf pine, loblolly pine, eastern redcedar. |
|                          |                             |                     |                        |                     | Southern red oak-----   | 50         |  |
|                          |                             |                     |                        |                     | White oak-----          | 50         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 40         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| Mountainburg-----        | 5d2                         | Moderate            | Slight                 | Moderate            | Shortleaf pine-----     | 50         | Shortleaf pine, eastern redcedar, loblolly pine. |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 30         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| 21-----                  | 3c2                         | Slight              | Moderate               | Moderate            | Loblolly pine-----      | 80         | Loblolly pine.                                   |
| McKamie                  |                             |                     |                        |                     | Shortleaf pine-----     | 70         |  |
| 22-----                  | 2w6                         | Slight              | Severe                 | Moderate            | Green ash-----          | 70         | Eastern cottonwood, American sycamore, sweetgum. |
| Moreland                 |                             |                     |                        |                     | Eastern cottonwood----- | 100        |  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 90         |  |
|                          |                             |                     |                        |                     | American sycamore-----  | ---        |  |
|                          |                             |                     |                        |                     | Water oak-----          | 90         |  |
| 23, 24-----              | 5d2                         | Slight              | Slight                 | Moderate            | Shortleaf pine-----     | 50         | Shortleaf pine, eastern redcedar, loblolly pine. |
| Mountainburg             |                             |                     |                        |                     | Eastern redcedar-----   | 30         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| 25-----                  | 5x3                         | Slight              | Severe                 | Moderate            | Shortleaf pine-----     | 50         | Shortleaf pine, eastern redcedar, loblolly pine. |
| Mountainburg             |                             |                     |                        |                     | Eastern redcedar-----   | 30         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| 26-----                  | 5x3                         | Severe              | Severe                 | Moderate            | Shortleaf pine-----     | 50         | Shortleaf pine, eastern redcedar, loblolly pine. |
| Mountainburg             |                             |                     |                        |                     | Eastern redcedar-----   | 30         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Map symbol and soil name | Wood-land suitability group | Management concerns |                        |                     | Potential productivity   |                                    | Trees to plant  |
|--------------------------|-----------------------------|---------------------|------------------------|---------------------|--|------------------------------------|---|
|                          |                             | Erosion hazard      | Equip-ment limita-tion | Seedling mortal-ity | Common trees   | Site index                         |   |
| 27, 28-----<br>Muskogee  | 3o7                         | Slight              | Slight                 | Slight              | Shortleaf pine-----<br>Sweetgum-----<br>Loblolly pine-----<br>Water oak-----<br>Southern red oak-----                          | 70<br>80<br>---<br>---<br>---      | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar,<br>Shumard oak,<br>sweetgum. |
| 29, 30, 31-----<br>Nella | 3o7                         | Slight              | Slight                 | Slight              | Shortleaf pine-----<br>Southern red oak-----<br>Eastern redcedar-----<br>Black oak-----<br>Black walnut-----<br>White ash----- | 71<br>71<br>55<br>70<br>---<br>--- | Shortleaf pine,<br>loblolly pine, black<br>walnut.                                  |
| 32:*<br>Nella-----       | 3o7                         | Slight              | Slight                 | Slight              | Shortleaf pine-----<br>Northern red oak-----<br>Eastern redcedar-----<br>White ash-----<br>Black walnut-----                   | 71<br>71<br>55<br>---<br>---       | Shortleaf pine,<br>loblolly pine, black<br>walnut.                                  |
| Enders-----              | 4o1                         | Slight              | Slight                 | Slight              | Shortleaf pine-----<br>Southern red oak-----<br>White oak-----<br>Northern red oak-----  | 60<br>60<br>55<br>60               | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.                              |
| 33:*<br>Nella-----       | 3r9                         | Severe              | Severe                 | Slight              | Shortleaf pine-----<br>Northern red oak-----<br>Eastern redcedar-----<br>White ash-----<br>Black walnut-----                   | 71<br>71<br>55<br>---<br>---       | Shortleaf pine,<br>loblolly pine, black<br>walnut.                                  |
| Enders-----              | 5r3                         | Severe              | Severe                 | Moderate            | Southern red oak-----<br>White oak-----<br>Eastern redcedar-----<br>Shortleaf pine-----  | 50<br>50<br>35<br>50               | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.                              |
| 34:*<br>Nella-----       | 4x9                         | Severe              | Severe                 | Slight              | Shortleaf pine-----<br>Southern red oak-----<br>Eastern redcedar-----<br>Black oak-----<br>Black walnut-----                   | 60<br>60<br>40<br>---<br>---       | Shortleaf pine,<br>loblolly pine, black<br>walnut.                                  |
| Enders-----              | 5x3                         | Moderate            | Severe                 | Moderate            | Southern red oak-----<br>White oak-----<br>Eastern redcedar-----<br>Shortleaf pine-----  | 50<br>50<br>35<br>50               | Loblolly pine,<br>shortleaf pine,<br>eastern redcedar.                              |
| Mountainburg-----        | 5x3                         | Severe              | Severe                 | Moderate            | Shortleaf pine-----<br>Eastern redcedar-----<br>Loblolly pine-----   | 50<br>30<br>---                    | Shortleaf pine,<br>eastern redcedar,<br>loblolly pine.                              |
| 35:*<br>Nella-----       | 3o7                         | Slight              | Slight                 | Slight              | Shortleaf pine-----<br>Northern red oak-----<br>Eastern redcedar-----<br>White ash-----<br>Black walnut-----                   | 71<br>71<br>61<br>---<br>---       | Shortleaf pine,<br>loblolly pine, black<br>walnut.                                  |
| Mountainburg-----        | 5x3                         | Moderate            | Severe                 | Moderate            | Shortleaf pine-----<br>Eastern redcedar-----<br>Loblolly pine-----   | 50<br>30<br>---                    | Shortleaf pine,<br>eastern redcedar,<br>loblolly pine.                              |

See footnote at end of table.



TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

| Map symbol and soil name | Wood-land suitability group | Management concerns |                        |                     | Potential productivity  |            | Trees to plant   |
|--------------------------|-----------------------------|---------------------|------------------------|---------------------|-------------------------|------------|--|
|                          |                             | Erosion hazard      | Equip-ment limita-tion | Seedling mortal-ity | Common trees            | Site index |  |
| 36:*                     |                             |                     |                        |                     |                         |            |  |
| Nella-----               | 3r9                         | Severe              | Severe                 | Slight              | Shortleaf pine-----     | 71         | Shortleaf pine, loblolly pine, black walnut.   |
|                          |                             |                     |                        |                     | Northern red oak-----   | 71         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 55         |  |
|                          |                             |                     |                        |                     | White ash-----          | ---        |  |
|                          |                             |                     |                        |                     | Black walnut-----       | ---        |  |
| Mountainburg-----        | 5x3                         | Severe              | Severe                 | Moderate            | Shortleaf pine-----     | 50         | Shortleaf pine, eastern redcedar, loblolly pine.   |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 30         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | ---        |  |
| 37, 38-----              |                             |                     |                        |                     |                         |            |  |
| Pickwick-----            | 3o7                         | Slight              | Slight                 | Slight              | White oak-----          | 73         | Black walnut, loblolly pine.   |
|                          |                             |                     |                        |                     | Shortleaf pine-----     | 70         |  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | 80         |  |
| 39-----                  |                             |                     |                        |                     |                         |            |  |
| Rilla-----               | 2o4                         | Slight              | Slight                 | Slight              | Eastern cottonwood----- | 100        | Eastern cottonwood, American sycamore.   |
|                          |                             |                     |                        |                     | Cherrybark oak-----     | 100        |  |
|                          |                             |                     |                        |                     | Nuttall oak-----        | 86         |  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 95         |  |
|                          |                             |                     |                        |                     | Pecan-----              | ---        |  |
|                          |                             |                     |                        |                     | American sycamore-----  | ---        |  |
| 40, 41-----              |                             |                     |                        |                     |                         |            |  |
| Roellen-----             | 2w6                         | Slight              | Severe                 | Slight              | Eastern cottonwood----- | 100        | Eastern cottonwood, sweetgum.  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 90         |  |
|                          |                             |                     |                        |                     | Water oak-----          | 90         |  |
|                          |                             |                     |                        |                     | Cherrybark oak-----     | 90         |  |
| 42, 43-----              |                             |                     |                        |                     |                         |            |  |
| Roxana-----              | 1o4                         | Slight              | Slight                 | Slight              | Eastern cottonwood----- | 115        | Eastern cottonwood, American sycamore, cherrybark oak.   |
|                          |                             |                     |                        |                     | Sweetgum-----           | 100        |  |
|                          |                             |                     |                        |                     | Pecan-----              | ---        |  |
|                          |                             |                     |                        |                     | American sycamore-----  | ---        |  |
|                          |                             |                     |                        |                     | Water oak-----          | ---        |  |
|                          |                             |                     |                        |                     | Cherrybark oak-----     | ---        |  |
| 44-----                  |                             |                     |                        |                     |                         |            |  |
| Spadra-----              | 2o7                         | Slight              | Slight                 | Slight              | Shortleaf pine-----     | 80         | Loblolly pine, shortleaf pine, black locust, southern red oak, eastern redcedar.               |
|                          |                             |                     |                        |                     | Southern red oak-----   | 80         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 60         |  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 70         |  |
| 45:*                     |                             |                     |                        |                     |                         |            |  |
| Spadra-----              | 2o7                         | Slight              | Slight                 | Slight              | Shortleaf pine-----     | 80         | Loblolly pine, shortleaf pine, black walnut, black locust, southern red oak, eastern redcedar. |
|                          |                             |                     |                        |                     | Southern red oak-----   | 80         |  |
|                          |                             |                     |                        |                     | Eastern redcedar-----   | 60         |  |
| Ceda-----                |                             |                     |                        |                     |                         |            |  |
|                          | 3f8                         | Slight              | Slight                 | Moderate            | Shortleaf pine-----     | 70         | Loblolly pine, shortleaf pine, American sycamore, sweetgum.                                    |
|                          |                             |                     |                        |                     | Southern red oak-----   | ---        |  |
|                          |                             |                     |                        |                     | White oak-----          | ---        |  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 80         |  |
|                          |                             |                     |                        |                     | American sycamore-----  | 80         |  |
| 46-----                  |                             |                     |                        |                     |                         |            |  |
| Taft-----                | 3w8                         | Slight              | Moderate               | Moderate            | Water oak-----          | 76         | Loblolly pine, shortleaf pine, water oak, sweetgum.  |
|                          |                             |                     |                        |                     | Loblolly pine-----      | 85         |  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 80         |  |
|                          |                             |                     |                        |                     | Shortleaf pine-----     | 60         |  |
| 47*                      |                             |                     |                        |                     |                         |            |  |
| Udorthents-----          |                             |                     |                        |                     |                         |            |  |
| 48-----                  |                             |                     |                        |                     |                         |            |  |
| Wrightsville-----        | 3w9                         | Slight              | Severe                 | Moderate            | Loblolly pine-----      | 80         | Loblolly pine, sweetgum, water oak, willow oak.  |
|                          |                             |                     |                        |                     | Sweetgum-----           | 80         |  |
|                          |                             |                     |                        |                     | Water oak-----          | 80         |  |

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

| Map symbol and soil name | Camp areas   | Picnic areas   | Playgrounds  | Paths and trails                                    |
|--------------------------|--|--|--|---|
| 1-----<br>Barling        | Severe:<br>floods.                                   | Moderate:<br>wetness.                                | Moderate:<br>wetness,<br>floods.                     | Slight.   |
| 2-----<br>Bruno          | Slight-----  | Slight-----  | Slight-----  | Slight.   |
| 3-----<br>Bruno          | Severe:<br>floods.                                   | Slight-----  | Moderate:<br>floods.                                 | Slight.   |
| 4-----<br>Cane           | Moderate:<br>wetness.                                | Moderate:<br>wetness.                                | Severe:<br>slope.                                    | Slight.   |
| 5, 6-----<br>Dardanelle  | Slight-----  | Slight-----  | Slight-----  | Slight.   |
| 7-----<br>Enders         | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>small stones,<br>percs slowly.            | Slight.   |
| 8-----<br>Enders         | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Slight.   |
| 9-----<br>Enders         | Severe:<br>slope,<br>percs slowly.                   | Severe:<br>slope,<br>percs slowly.                   | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>erodes easily.                 |
| 10:*<br>Enders-----      | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Slight.   |
| Mountainburg-----        | Severe:<br>small stones,<br>depth to rock.           | Severe:<br>small stones,<br>depth to rock.           | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>small stones.           |
| 11:*<br>Enders-----      | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope.                                   |
| Mountainburg-----        | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>slope,<br>small stones. |
| 12-----<br>Guthrie       | Severe:<br>floods,<br>wetness.                       | Severe:<br>wetness.                                  | Severe:<br>wetness.                                  | Severe:<br>wetness.                                 |
| 13, 14-----<br>Leadvale  | Moderate:<br>wetness,<br>percs slowly.               | Moderate:<br>wetness,<br>percs slowly.               | Moderate:<br>slope,<br>wetness,<br>percs slowly.     | Slight.   |

See footnote at end of table.



TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

| Map symbol and soil name | Camp areas   | Picnic areas   | Playgrounds  | Paths and trails                                    |
|--------------------------|--|--|--|---|
| 15:*<br>Leesburg-----    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope,<br>small stones.                   | Severe:<br>slope.                                   |
| Enders-----              | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope.                                   |
| 16, 17-----<br>Linker    | Slight-----  | Slight-----  | Moderate:<br>slope,<br>small stones.                 | Slight.   |
| 18-----<br>Linker        | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Slight.   |
| 19:*<br>Linker-----      | Slight-----  | Slight-----  | Moderate:<br>slope,<br>small stones.                 | Slight.   |
| Mountainburg-----        | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>small stones.                             | Slight.   |
| 20:*<br>Linker-----      | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Slight.   |
| Mountainburg-----        | Severe:<br>slope,<br>depth to rock.                  | Severe:<br>depth to rock.                            | Severe:<br>slope,<br>small stones.                   | Slight.   |
| 21-----<br>McKamie       | Moderate:<br>percs slowly.                           | Slight-----  | Moderate:<br>slope,<br>percs slowly.                 | Slight.   |
| 22-----<br>Moreland      | Severe:<br>wetness,<br>percs slowly.                 | Severe:<br>wetness,<br>too clayey,<br>percs slowly.  | Severe:<br>too clayey,<br>wetness.                   | Severe:<br>wetness,<br>too clayey.                  |
| 23-----<br>Mountainburg  | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>small stones.                             | Slight.   |
| 24-----<br>Mountainburg  | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>slope,<br>small stones.                   | Slight.   |
| 25-----<br>Mountainburg  | Severe:<br>small stones,<br>depth to rock.           | Severe:<br>small stones,<br>depth to rock.           | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>small stones.           |
| 26-----<br>Mountainburg  | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>slope,<br>small stones. |
| 27, 28-----<br>Muskogee  | Severe:<br>wetness.                                  | Moderate:<br>wetness,<br>percs slowly.               | Severe:<br>wetness.                                  | Slight.   |
| 29-----<br>Nella         | Slight-----  | Slight-----  | Moderate:<br>slope,<br>small stones.                 | Slight.   |
| 30-----<br>Nella         | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Slight.   |

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

| Map symbol and soil name | Camp areas   | Picnic areas   | Playgrounds  | Paths and trails                                    |
|--------------------------|--|--|--|---|
| 31-----<br>Nella         | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Moderate:<br>slope.                                 |
| 32:*<br>Nella-----       | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Slight.   |
| Enders-----              | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>small stones,<br>percs slowly.            | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Slight.   |
| 33:*<br>Nella-----       | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                   |
| Enders-----              | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope.                                   |
| 34:*<br>Nella-----       | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                   |
| Enders-----              | Severe:<br>slope,<br>percs slowly.                   | Severe:<br>slope,<br>percs slowly.                   | Severe:<br>slope,<br>small stones,<br>percs slowly.  | Severe:<br>slope,<br>erodes easily.                 |
| Mountainburg-----        | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>slope,<br>small stones. |
| 35:*<br>Nella-----       | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Slight.   |
| Mountainburg-----        | Severe:<br>small stones,<br>depth to rock.           | Severe:<br>small stones,<br>depth to rock.           | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>small stones.           |
| 36:*<br>Nella-----       | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                   |
| Mountainburg-----        | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>slope,<br>small stones,<br>depth to rock. | Severe:<br>large stones,<br>slope,<br>small stones. |
| 37, 38-----<br>Pickwick  | Slight-----  | Slight-----  | Moderate:<br>slope.                                  | Slight.   |
| 39-----<br>Rilla         | Slight-----  | Slight-----  | Slight-----  | Slight.   |
| 40-----<br>Roellen       | Severe:<br>wetness,<br>too clayey.                   | Severe:<br>wetness,<br>too clayey.                   | Severe:<br>too clayey,<br>wetness.                   | Severe:<br>wetness,<br>too clayey.                  |
| 41-----<br>Roellen       | Severe:<br>floods,<br>wetness,<br>too clayey.        | Severe:<br>wetness,<br>too clayey.                   | Severe:<br>too clayey,<br>wetness.                   | Severe:<br>wetness,<br>too clayey.                  |

See footnote at end of table.



TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

| Map symbol and<br>soil name | Camp areas                           | Picnic areas                           | Playgrounds                          | Paths and trails                      |
|-----------------------------|--------------------------------------|--|--------------------------------------|---------------------------------------|
| 42-----<br>Roxana           | Slight-----                          | Slight-----                            | Slight-----                          | Slight.                               |
| 43-----<br>Roxana           | Severe:<br>floods.                   | Slight-----                            | Moderate:<br>floods.                 | Slight.                               |
| 44-----<br>Spadra           | Severe:<br>floods.                   | Slight-----                            | Moderate:<br>floods.                 | Slight.                               |
| 45:.*<br>Spadra-----        | Severe:<br>floods.                   | Slight-----                            | Moderate:<br>floods.                 | Slight.                               |
| Ceda-----                   | Severe:<br>floods,<br>small stones.  | Severe:<br>small stones.               | Severe:<br>floods,<br>small stones.  | Moderate:<br>floods,<br>small stones. |
| 46-----<br>Taft             | Severe:<br>wetness.                  | Moderate:<br>wetness,<br>percs slowly. | Severe:<br>wetness.                  | Moderate:<br>wetness.                 |
| 47.*<br>Udorthents          |                                      |  |                                      |                                       |
| 48-----<br>Wrightsville     | Severe:<br>wetness,<br>percs slowly. | Severe:<br>wetness,<br>percs slowly.   | Severe:<br>wetness,<br>percs slowly. | Severe:<br>wetness.                   |

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

| Map symbol and soil name | Potential for habitat elements |                     |                         |                |                    |                |                     | Potential as habitat for-- |                   |                  |
|--------------------------|--------------------------------|---------------------|-------------------------|----------------|--------------------|----------------|---------------------|----------------------------|-------------------|------------------|
|                          | Grain and seed crops           | Grasses and legumes | Wild herba-ceous plants | Hardwood trees | Conif-erous plants | Wetland plants | Shallow water areas | Openland wildlife          | Woodland wildlife | Wetland wildlife |
| 1-----<br>Barling        | Fair                           | Good                | Good                    | Good           | Poor               | Poor           | Poor                | Good                       | Good              | Poor.            |
| 2, 3-----<br>Bruno       | Poor                           | Poor                | Fair                    | Poor           | Poor               | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |
| 4-----<br>Cane           | Fair                           | Good                | Good                    | Good           | Good               | Poor           | Very poor.          | Good                       | Fair              | Very poor.       |
| 5, 6-----<br>Dardanelle  | Good                           | Good                | Good                    | Good           | ---                | Poor           | Fair                | Good                       | Good              | Poor.            |
| 7, 8-----<br>Enders      | Fair                           | Good                | Good                    | Good           | Good               | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| 9-----<br>Enders         | Very poor.                     | Very poor.          | Good                    | Good           | Good               | Very poor.     | Very poor.          | Very poor.                 | Good              | Very poor.       |
| 10:*-----<br>Enders      | Fair                           | Good                | Good                    | Good           | Good               | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| Mountainburg-----        | Very poor.                     | Poor                | Poor                    | Very poor.     | Very poor.         | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |
| 11:*-----<br>Enders      | Very poor.                     | Poor                | Good                    | Good           | Good               | Very poor.     | Very poor.          | Poor                       | Good              | Very poor.       |
| Mountainburg-----        | Very poor.                     | Poor                | Poor                    | Very poor.     | Very poor.         | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |
| 12-----<br>Guthrie       | Poor                           | Fair                | Fair                    | Fair           | Fair               | Good           | Good                | Fair                       | Fair              | Good.            |
| 13-----<br>Leadvale      | Fair                           | Good                | Good                    | Good           | Good               | Poor           | Poor                | Good                       | Good              | Poor.            |
| 14-----<br>Leadvale      | Fair                           | Good                | Good                    | Good           | Good               | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| 15:*-----<br>Leesburg    | Poor                           | Fair                | Good                    | Good           | Good               | Very poor.     | Very poor.          | Fair                       | Good              | Very poor.       |
| Enders-----              | Very poor.                     | Poor                | Good                    | Good           | Good               | Very poor.     | Very poor.          | Poor                       | Good              | Very poor.       |
| 16, 17-----<br>Linker    | Fair                           | Good                | Good                    | Fair           | Fair               | Poor           | Very poor.          | Good                       | Fair              | Very poor.       |
| 18-----<br>Linker        | Fair                           | Good                | Good                    | Fair           | Fair               | Very poor.     | Very poor.          | Good                       | Fair              | Very poor.       |
| 19:*-----<br>Linker      | Fair                           | Good                | Good                    | Fair           | Fair               | Poor           | Very poor.          | Good                       | Fair              | Very poor.       |
| Mountainburg-----        | Poor                           | Poor                | Poor                    | Very poor.     | Very poor.         | Poor           | Very poor.          | Poor                       | Very poor.        | Very poor.       |

See footnote at end of table.



TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

| Map symbol and soil name | Potential for habitat elements |                     |                          |                |                     |                |                     | Potential as habitat for-- |                   |                  |
|--------------------------|--------------------------------|---------------------|--------------------------|----------------|---------------------|----------------|---------------------|----------------------------|-------------------|------------------|
|                          | Grain and seed crops           | Grasses and legumes | Wild herba- ceous plants | Hardwood trees | Conif- erous plants | Wetland plants | Shallow water areas | Openland wildlife          | Woodland wildlife | Wetland wildlife |
| 20:*                     |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Linker-----              | Fair                           | Good                | Good                     | Fair           | Fair                | Very poor.     | Very poor.          | Good                       | Fair              | Very poor.       |
| Mountainburg-----        | Very poor.                     | Poor                | Poor                     | Very poor.     | Very poor.          | Very poor.     | Very poor.          | Poor                       | Very poor.        | Very poor.       |
| 21-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| McKamie                  | Fair                           | Good                | Good                     | ---            | Fair                | Very poor.     | Very poor.          | Good                       | Fair              | Very poor.       |
| 22-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Moreland                 | Fair                           | Fair                | Fair                     | Good           | ---                 | Good           | Good                | Fair                       | Good              | Good.            |
| 23-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Mountainburg             | Poor                           | Poor                | Poor                     | Very poor.     | Very poor.          | Poor           | Very poor.          | Poor                       | Very poor.        | Very poor.       |
| 24-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Mountainburg             | Very poor.                     | Poor                | Poor                     | Very poor.     | Very poor.          | Very poor.     | Very poor.          | Poor                       | Very poor.        | Very poor.       |
| 25, 26-----              |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Mountainburg             | Very poor.                     | Poor                | Poor                     | Very poor.     | Very poor.          | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |
| 27-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Muskogee                 | Good                           | Good                | Good                     | Good           | Good                | Poor           | Poor                | Good                       | Good              | Poor.            |
| 28-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Muskogee                 | Fair                           | Good                | Good                     | Good           | Good                | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 29-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella                    | Good                           | Good                | Good                     | Good           | Good                | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 30-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella                    | Fair                           | Good                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| 31-----                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella                    | Poor                           | Fair                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Fair                       | Good              | Very poor.       |
| 32:*                     |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella-----               | Fair                           | Good                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| Enders-----              | Fair                           | Good                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| 33:*                     |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella-----               | Very poor.                     | Poor                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Poor                       | Good              | Very poor.       |
| Enders-----              | Very poor.                     | Poor                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Poor                       | Good              | Very poor.       |
| 34:*                     |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella-----               | Very poor.                     | Poor                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Poor                       | Good              | Very poor.       |
| Enders.                  |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Mountainburg-----        | Very poor.                     | Poor                | Poor                     | Very poor.     | Very poor.          | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |
| 35:*                     |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| Nella-----               | Fair                           | Good                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| Mountainburg-----        | Very poor.                     | Poor                | Poor                     | Very poor.     | Very poor.          | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |

See footnote at end of table.

TABLE 10.--WILDLIFE HABITAT POTENTIALS--Continued

| Map symbol and soil name | Potential for habitat elements |                     |                          |                |                     |                |                     | Potential as habitat for-- |                   |                  |
|--------------------------|--------------------------------|---------------------|--------------------------|----------------|---------------------|----------------|---------------------|----------------------------|-------------------|------------------|
|                          | Grain and seed crops           | Grasses and legumes | Wild herba- ceous plants | Hardwood trees | Conif- erous plants | Wetland plants | Shallow water areas | Openland wildlife          | Woodland wildlife | Wetland wildlife |
| 36:*<br>Nella-----       | Very poor.                     | Poor                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Poor                       | Good              | Very poor.       |
| Mountainburg-----        | Very poor.                     | Poor                | Poor                     | Very poor.     | Very poor.          | Very poor.     | Very poor.          | Poor                       | Poor              | Very poor.       |
| 37-----<br>Pickwick      | Good                           | Good                | Good                     | Good           | Good                | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 38-----<br>Pickwick      | Fair                           | Good                | Good                     | Good           | Good                | Very poor.     | Very poor.          | Good                       | Good              | Very poor.       |
| 39-----<br>Rilla         | Good                           | Good                | Good                     | Good           | ---                 | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 40-----<br>Roellen       | Fair                           | Fair                | Fair                     | Good           | Fair                | Good           | Good                | Fair                       | Good              | Good.            |
| 41-----<br>Roellen       | Poor                           | Fair                | Fair                     | Fair           | Fair                | Good           | Good                | Fair                       | Fair              | Good.            |
| 42-----<br>Roxana        | Good                           | Good                | Good                     | Good           | ---                 | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 43-----<br>Roxana        | Good                           | Good                | Good                     | Good           | ---                 | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 44-----<br>Spadra        | Good                           | Good                | Good                     | Good           | Good                | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| 45:*<br>Spadra-----      | Good                           | Good                | Good                     | Good           | Good                | Poor           | Very poor.          | Good                       | Good              | Very poor.       |
| Ceda-----                | Poor                           | Fair                | Fair                     | Poor           | Poor                | Poor           | Very poor.          | Fair                       | Poor              | Very poor.       |
| 46-----<br>Taft          | Fair                           | Good                | Good                     | Good           | Good                | Fair           | Fair                | Good                       | Good              | Fair.            |
| 47.*<br>Udorthents       |                                |                     |                          |                |                     |                |                     |                            |                   |                  |
| 48-----<br>Wrightsville  | Fair                           | Fair                | Fair                     | Fair           | Fair                | Good           | Good                | Fair                       | Fair              | Good.            |

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

| Map symbol and soil name | Shallow excavations                                  | Dwellings without basements                          | Dwellings with basements                             | Small commercial buildings                           | Local roads and streets                              | Lawns and landscaping                               |
|--------------------------|--|--|--|--|--|---|
| 1-----<br>Barling        | Severe:<br>wetness.                                  | Severe:<br>floods,<br>wetness.                       | Severe:<br>floods,<br>wetness.                       | Severe:<br>floods,<br>wetness.                       | Severe:<br>floods.                                   | Moderate:<br>wetness,<br>floods.                    |
| 2-----<br>Bruno          | Severe:<br>cutbanks cave.                            | Slight-----  | Moderate:<br>wetness.                                | Slight-----  | Slight-----  | Moderate:<br>droughty.                              |
| 3-----<br>Bruno          | Severe:<br>cutbanks cave.                            | Severe:<br>floods.                                   | Severe:<br>floods.                                   | Severe:<br>floods.                                   | Severe:<br>floods.                                   | Moderate:<br>floods,<br>droughty.                   |
| 4-----<br>Cane           | Moderate:<br>wetness.                                | Moderate:<br>wetness.                                | Severe:<br>wetness.                                  | Moderate:<br>wetness,<br>slope.                      | Moderate:<br>wetness.                                | Slight.   |
| 5, 6-----<br>Dardanelle  | Slight-----  | Moderate:<br>shrink-swell.                           | Moderate:<br>shrink-swell.                           | Moderate:<br>shrink-swell.                           | Severe:<br>low strength.                             | Slight.   |
| 7-----<br>Enders         | Moderate:<br>too clayey.                             | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>low strength,<br>shrink-swell.            | Severe:<br>small stones.                            |
| 8-----<br>Enders         | Moderate:<br>too clayey,<br>slope.                   | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>shrink-swell.            | Severe:<br>small stones.                            |
| 9-----<br>Enders         | Severe:<br>slope.                                    | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>slope,<br>shrink-swell.                   | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>slope,<br>shrink-swell.  | Severe:<br>large stones,<br>slope.                  |
| 10:*<br>Enders-----      | Moderate:<br>too clayey,<br>slope.                   | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>shrink-swell.            | Severe:<br>small stones.                            |
| Mountainburg----         | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>small stones,<br>large stones.           |
| 11:*<br>Enders-----      | Severe:<br>slope.                                    | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>slope,<br>shrink-swell.                   | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>slope,<br>shrink-swell.  | Severe:<br>small stones,<br>slope.                  |
| Mountainburg----         | Severe:<br>depth to rock,<br>large stones,<br>slope. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>small stones,<br>large stones,<br>slope. |
| 12-----<br>Guthrie       | Severe:<br>wetness.                                  | Severe:<br>floods,<br>wetness.                       | Severe:<br>floods,<br>wetness.                       | Severe:<br>floods,<br>wetness.                       | Severe:<br>wetness,<br>low strength.                 | Severe:<br>wetness.                                 |
| 13-----<br>Leadvale      | Severe:<br>wetness.                                  | Moderate:<br>wetness.                                | Severe:<br>wetness.                                  | Moderate:<br>wetness.                                | Moderate:<br>low strength,<br>wetness.               | Slight.   |
| 14-----<br>Leadvale      | Severe:<br>wetness.                                  | Moderate:<br>wetness.                                | Severe:<br>wetness.                                  | Moderate:<br>wetness,<br>slope.                      | Moderate:<br>low strength,<br>wetness.               | Slight.   |
| 15:*<br>Leesburg-----    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                   |

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

| Map symbol and soil name | Shallow excavations                                  | Dwellings without basements                          | Dwellings with basements                             | Small commercial buildings                           | Local roads and streets                               | Lawns and landscaping                               |
|--------------------------|--|--|--|--|---|---|
| 15:*<br>Enders-----      | Severe:<br>slope.                                    | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>slope,<br>shrink-swell.                   | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>slope,<br>shrink-swell.   | Severe:<br>small stones,<br>slope.                  |
| 16-----<br>Linker        | Severe:<br>depth to rock.                            | Moderate:<br>depth to rock.                          | Severe:<br>depth to rock.                            | Moderate:<br>depth to rock.                          | Moderate:<br>depth to rock.                           | Moderate:<br>thin layer.                            |
| 17-----<br>Linker        | Severe:<br>depth to rock.                            | Moderate:<br>depth to rock.                          | Severe:<br>depth to rock.                            | Moderate:<br>slope,<br>depth to rock.                | Moderate:<br>depth to rock.                           | Moderate:<br>thin layer.                            |
| 18-----<br>Linker        | Severe:<br>depth to rock.                            | Moderate:<br>slope,<br>depth to rock.                | Severe:<br>depth to rock.                            | Severe:<br>slope.                                    | Moderate:<br>depth to rock,<br>slope.                 | Moderate:<br>thin layer,<br>slope.                  |
| 19:*<br>Linker-----      | Severe:<br>depth to rock.                            | Moderate:<br>depth to rock.                          | Severe:<br>depth to rock.                            | Moderate:<br>slope,<br>depth to rock.                | Moderate:<br>depth to rock.                           | Moderate:<br>thin layer.                            |
| Mountainburg----         | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                             | Severe:<br>thin layer.                              |
| 20:*<br>Linker-----      | Severe:<br>depth to rock.                            | Moderate:<br>slope,<br>depth to rock.                | Severe:<br>depth to rock.                            | Severe:<br>slope.                                    | Moderate:<br>depth to rock,<br>slope.                 | Moderate:<br>thin layer,<br>slope.                  |
| Mountainburg-----        | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>slope,<br>depth to rock.                  | Severe:<br>depth to rock.                             | Severe:<br>thin layer.                              |
| 21-----<br>McKamie       | Severe:<br>too clayey.                               | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>low strength,<br>shrink-swell.             | Slight.   |
| 22-----<br>Moreland      | Severe:<br>wetness.                                  | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>low strength,<br>shrink-swell. | Severe:<br>wetness,<br>too clayey.                  |
| 23-----<br>Mountainburg  | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                             | Severe:<br>thin layer.                              |
| 24-----<br>Mountainburg  | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                            | Severe:<br>slope,<br>depth to rock.                  | Severe:<br>depth to rock.                             | Severe:<br>thin layer.                              |
| 25-----<br>Mountainburg  | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.            | Severe:<br>small stones,<br>large stones.           |
| 26-----<br>Mountainburg  | Severe:<br>depth to rock,<br>large stones,<br>slope. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones.  | Severe:<br>small stones,<br>large stones,<br>slope. |
| 27, 28-----<br>Muskogee  | Severe:<br>wetness.                                  | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>low strength,<br>shrink-swell.             | Moderate:<br>wetness.                               |
| 29-----<br>Nella         | Slight-----  | Slight-----  | Slight-----  | Moderate:<br>slope.                                  | Slight-----   | Moderate:<br>large stones.                          |
| 30-----<br>Nella         | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Moderate:<br>slope.                                   | Moderate:<br>large stones,<br>slope.                |

See footnote at end of table.



TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

| Map symbol and soil name | Shallow excavations                                  | Dwellings without basements                          | Dwellings with basements                             | Small commercial buildings                           | Local roads and streets                               | Lawns and landscaping                               |
|--------------------------|--|--|--|--|---|---|
| 31-----<br>Nella         | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                     | Severe:<br>slope.                                   |
| 32:*<br>Nella-----       | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Moderate:<br>slope.                                   | Moderate:<br>large stones,<br>slope.                |
| Enders-----              | Moderate:<br>too clayey,<br>slope.                   | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>shrink-swell.             | Severe:<br>small stones.                            |
| 33:*<br>Nella-----       | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                     | Severe:<br>slope.                                   |
| Enders-----              | Severe:<br>slope.                                    | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>shrink-swell.                             | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>slope,<br>shrink-swell.   | Severe:<br>small stones,<br>slope.                  |
| 34:*<br>Nella-----       | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                     | Severe:<br>slope.                                   |
| Enders-----              | Severe:<br>slope.                                    | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>slope,<br>shrink-swell.                   | Severe:<br>shrink-swell,<br>slope.                   | Severe:<br>low strength,<br>slope,<br>shrink-swell.   | Severe:<br>large stones,<br>slope.                  |
| Mountainburg-----        | Severe:<br>depth to rock,<br>large stones,<br>slope. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones.  | Severe:<br>small stones,<br>large stones,<br>slope. |
| 35:*<br>Nella-----       | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Moderate:<br>slope.                                  | Severe:<br>slope.                                    | Moderate:<br>slope.                                   | Moderate:<br>large stones,<br>slope.                |
| Mountainburg-----        | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>large stones.            | Severe:<br>small stones,<br>large stones.           |
| 36:*<br>Nella-----       | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                    | Severe:<br>slope.                                     | Severe:<br>slope.                                   |
| Mountainburg-----        | Severe:<br>depth to rock,<br>large stones,<br>slope. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>slope,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>slope,<br>large stones.  | Severe:<br>small stones,<br>large stones,<br>slope. |
| 37-----<br>Pickwick      | Slight-----  | Slight-----  | Moderate:<br>shrink-swell.                           | Slight-----  | Severe:<br>low strength.                              | Slight.   |
| 38-----<br>Pickwick      | Slight-----  | Slight-----  | Moderate:<br>shrink-swell.                           | Moderate:<br>slope.                                  | Severe:<br>low strength.                              | Slight.   |
| 39-----<br>Rilla         | Moderate:<br>too clayey,<br>wetness.                 | Moderate:<br>shrink-swell.                           | Moderate:<br>wetness,<br>shrink-swell.               | Moderate:<br>shrink-swell.                           | Severe:<br>low strength.                              | Slight.   |
| 40-----<br>Roellen       | Severe:<br>wetness.                                  | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>wetness,<br>shrink-swell.                 | Severe:<br>shrink-swell,<br>low strength,<br>wetness. | Severe:<br>wetness,<br>too clayey.                  |

See footnote at end of table.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

| Map symbol and soil name | Shallow excavations       | Dwellings without basements                     | Dwellings with basements                        | Small commercial buildings                      | Local roads and streets                               | Lawns and landscaping              |
|--------------------------|---------------------------|---|---|---|---|------------------------------------|
| 41-----<br>Roellen       | Severe:<br>wetness.       | Severe:<br>floods,<br>wetness,<br>shrink-swell. | Severe:<br>floods,<br>wetness,<br>shrink-swell. | Severe:<br>floods,<br>wetness,<br>shrink-swell. | Severe:<br>low strength,<br>wetness,<br>floods.       | Severe:<br>wetness,<br>too clayey. |
| 42-----<br>Roxana        | Severe:<br>cutbanks cave. | Slight-----                                     | Moderate:<br>wetness.                           | Slight-----                                     | Slight-----   | Slight.                            |
| 43-----<br>Roxana        | Severe:<br>cutbanks cave. | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                                    | Moderate:<br>floods.               |
| 44-----<br>Spadra        | Moderate:<br>floods.      | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                                    | Moderate:<br>floods.               |
| 45:.*<br>Spadra-----     | Moderate:<br>floods.      | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                                    | Moderate:<br>floods.               |
| Ceda-----                | Moderate:<br>floods.      | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                              | Severe:<br>floods.                                    | Moderate:<br>floods,<br>droughty.  |
| 46-----<br>Taft          | Severe:<br>wetness.       | Severe:<br>wetness.                             | Severe:<br>wetness.                             | Severe:<br>wetness.                             | Severe:<br>low strength.                              | Moderate:<br>wetness.              |
| 47.*<br>Udorthents       |                           |   |   |   |   |                                    |
| 48-----<br>Wrightsville  | Severe:<br>wetness.       | Severe:<br>wetness,<br>shrink-swell.            | Severe:<br>wetness,<br>shrink-swell.            | Severe:<br>wetness,<br>shrink-swell.            | Severe:<br>low strength,<br>wetness,<br>shrink-swell. | Severe:<br>wetness.                |

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

| Map symbol and soil name | Septic tank absorption fields                        | Sewage lagoon areas                             | Trench sanitary landfill                           | Area sanitary landfill                          | Daily cover for landfill                               |
|--------------------------|--|---|--|---|--|
| 1-----<br>Barling        | Severe:<br>floods,<br>wetness.                       | Severe:<br>floods,<br>wetness.                  | Severe:<br>floods,<br>wetness.                     | Severe:<br>floods,<br>wetness.                  | Poor:<br>wetness.                                      |
| 2-----<br>Bruno          | Severe:<br>poor filter.                              | Severe:<br>seepage.                             | Severe:<br>seepage.                                | Severe:<br>seepage.                             | Poor:<br>seepage,<br>too sandy.                        |
| 3-----<br>Bruno          | Severe:<br>floods,<br>poor filter.                   | Severe:<br>seepage,<br>floods.                  | Severe:<br>floods,<br>seepage,<br>wetness.         | Severe:<br>floods,<br>seepage.                  | Poor:<br>seepage,<br>too sandy.                        |
| 4-----<br>Cane           | Severe:<br>wetness,<br>percs slowly.                 | Moderate:<br>slope.                             | Moderate:<br>wetness.                              | Moderate:<br>wetness.                           | Fair:<br>wetness.                                      |
| 5, 6-----<br>Dardanelle  | Moderate:<br>percs slowly.                           | Moderate:<br>seepage.                           | Moderate:<br>too clayey.                           | Slight-----                                     | Fair:<br>too clayey.                                   |
| 7-----<br>Enders         | Severe:<br>percs slowly.                             | Moderate:<br>depth to rock,<br>slope.           | Severe:<br>depth to rock,<br>too clayey.           | Moderate:<br>depth to rock.                     | Poor:<br>too clayey,<br>hard to pack.                  |
| 8-----<br>Enders         | Severe:<br>percs slowly.                             | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>too clayey.           | Moderate:<br>depth to rock,<br>slope.           | Poor:<br>too clayey,<br>hard to pack.                  |
| 9-----<br>Enders         | Severe:<br>percs slowly,<br>slope.                   | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>slope,<br>too clayey. | Severe:<br>slope.                               | Poor:<br>too clayey,<br>hard to pack,<br>slope.        |
| 10: *<br>Enders-----     | Severe:<br>percs slowly.                             | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>too clayey.           | Moderate:<br>depth to rock,<br>slope.           | Poor:<br>too clayey,<br>hard to pack.                  |
| Mountainburg-----        | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>seepage,<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>depth to rock,<br>seepage.           | Poor:<br>area reclaim,<br>small stones,<br>thin layer. |
| 11: *<br>Enders-----     | Severe:<br>percs slowly,<br>slope.                   | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>slope,<br>too clayey. | Severe:<br>slope.                               | Poor:<br>too clayey,<br>hard to pack,<br>slope.        |
| Mountainburg-----        | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>seepage,<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>seepage,<br>slope.    | Severe:<br>depth to rock,<br>seepage,<br>slope. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 12-----<br>Guthrie       | Severe:<br>percs slowly,<br>wetness.                 | Severe:<br>floods,<br>wetness.                  | Severe:<br>wetness.                                | Severe:<br>wetness.                             | Poor:<br>wetness.                                      |
| 13, 14-----<br>Leadvale  | Severe:<br>wetness,<br>percs slowly.                 | Severe:<br>wetness.                             | Severe:<br>depth to rock.                          | Moderate:<br>depth to rock,<br>wetness.         | Fair:<br>area reclaim,<br>too clayey,<br>wetness.      |

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

| Map symbol and<br>soil name | Septic tank<br>absorption<br>fields                  | Sewage lagoon<br>areas                                 | Trench<br>sanitary<br>landfill                     | Area<br>sanitary<br>landfill                    | Daily cover<br>for landfill                            |
|-----------------------------|--|--|--|---|--|
| 15:*                        |  |  |  |   |  |
| Leesburg-----               | Severe:<br>slope.                                    | Severe:<br>slope.                                      | Severe:<br>slope.                                  | Severe:<br>slope.                               | Poor:<br>slope.  |
| Enders-----                 | Severe:<br>percs slowly,<br>slope.                   | Severe:<br>slope.                                      | Severe:<br>depth to rock,<br>slope,<br>too clayey. | Severe:<br>slope.                               | Poor:<br>too clayey,<br>hard to pack,<br>slope.        |
| 16, 17-----                 |  |  |  |   |  |
| Linker                      | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                              | Severe:<br>depth to rock.                          | Severe:<br>depth to rock.                       | Poor:<br>area reclaim,<br>thin layer.                  |
| 18-----                     |  |  |  |   |  |
| Linker                      | Severe:<br>depth to rock.                            | Severe:<br>depth to rock,<br>slope.                    | Severe:<br>depth to rock.                          | Severe:<br>depth to rock.                       | Poor:<br>area reclaim,<br>thin layer.                  |
| 19:*                        |  |  |  |   |  |
| Linker-----                 | Severe:<br>depth to rock.                            | Severe:<br>depth to rock.                              | Severe:<br>depth to rock.                          | Severe:<br>depth to rock.                       | Poor:<br>area reclaim,<br>thin layer.                  |
| Mountainburg-----           | Severe:<br>depth to rock.                            | Severe:<br>depth to rock,<br>seepage.                  | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>seepage,<br>depth to rock.           | Poor:<br>area reclaim,<br>seepage,<br>small stones.    |
| 20:*                        |  |  |  |   |  |
| Linker-----                 | Severe:<br>depth to rock.                            | Severe:<br>depth to rock,<br>slope.                    | Severe:<br>depth to rock.                          | Severe:<br>depth to rock.                       | Poor:<br>area reclaim,<br>thin layer.                  |
| Mountainburg-----           | Severe:<br>depth to rock.                            | Severe:<br>slope,<br>depth to rock,<br>seepage.        | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>seepage,<br>depth to rock.           | Poor:<br>area reclaim,<br>seepage,<br>small stones.    |
| 21-----                     |  |  |  |   |  |
| McKamie                     | Severe:<br>percs slowly.                             | Moderate:<br>slope.                                    | Severe:<br>too clayey.                             | Slight-----                                     | Poor:<br>too clayey.                                   |
| 22-----                     |  |  |  |   |  |
| Moreland                    | Severe:<br>wetness,<br>percs slowly.                 | Severe:<br>wetness.                                    | Severe:<br>wetness,<br>too clayey.                 | Severe:<br>wetness.                             | Poor:<br>too clayey,<br>hard to pack,<br>wetness.      |
| 23-----                     |  |  |  |   |  |
| Mountainburg                | Severe:<br>depth to rock.                            | Severe:<br>depth to rock,<br>seepage.                  | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>seepage,<br>depth to rock.           | Poor:<br>area reclaim,<br>seepage,<br>small stones.    |
| 24-----                     |  |  |  |   |  |
| Mountainburg                | Severe:<br>depth to rock.                            | Severe:<br>slope,<br>depth to rock,<br>seepage.        | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>seepage,<br>depth to rock.           | Poor:<br>area reclaim,<br>seepage,<br>small stones.    |
| 25-----                     |  |  |  |   |  |
| Mountainburg                | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>seepage,<br>depth to rock,<br>large stones. | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>depth to rock,<br>seepage.           | Poor:<br>area reclaim,<br>small stones,<br>thin layer. |
| 26-----                     |  |  |  |   |  |
| Mountainburg                | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>seepage,<br>depth to rock,<br>slope.        | Severe:<br>depth to rock,<br>seepage,<br>slope.    | Severe:<br>depth to rock,<br>seepage,<br>slope. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 27, 28-----                 |  |  |  |   |  |
| Muskogee                    | Severe:<br>wetness,<br>percs slowly.                 | Severe:<br>wetness.                                    | Severe:<br>wetness,<br>too clayey.                 | Severe:<br>wetness.                             | Poor:<br>too clayey,<br>hard to pack,<br>wetness.      |

See footnote at end of table.



TABLE 12.--SANITARY FACILITIES--Continued

| Map symbol and soil name | Septic tank absorption fields                        | Sewage lagoon areas                             | Trench sanitary landfill                           | Area sanitary landfill                          | Daily cover for landfill                               |
|--------------------------|--|---|--|---|--|
| 29-----<br>Nella         | Moderate:<br>percs slowly.                           | Moderate:<br>seepage,<br>slope.                 | Moderate:<br>too clayey.                           | Slight-----                                     | Fair:<br>small stones.                                 |
| 30-----<br>Nella         | Moderate:<br>percs slowly,<br>slope.                 | Severe:<br>slope.                               | Moderate:<br>slope,<br>too clayey.                 | Moderate:<br>slope.                             | Fair:<br>small stones.                                 |
| 31-----<br>Nella         | Severe:<br>slope.                                    | Severe:<br>slope.                               | Severe:<br>slope.                                  | Severe:<br>slope.                               | Poor:<br>slope.  |
| 32: *<br>Nella-----      | Moderate:<br>percs slowly,<br>slope.                 | Severe:<br>slope.                               | Moderate:<br>slope,<br>too clayey.                 | Moderate:<br>slope.                             | Fair:<br>small stones.                                 |
| Enders-----              | Severe:<br>percs slowly.                             | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>too clayey.           | Moderate:<br>depth to rock,<br>slope.           | Poor:<br>too clayey,<br>hard to pack.                  |
| 33: *<br>Nella-----      | Severe:<br>slope.                                    | Severe:<br>slope.                               | Severe:<br>slope.                                  | Severe:<br>slope.                               | Poor:<br>slope.  |
| Enders-----              | Severe:<br>percs slowly,<br>slope.                   | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>slope,<br>too clayey. | Severe:<br>slope.                               | Poor:<br>too clayey,<br>hard to pack,<br>slope.        |
| 34: *<br>Nella-----      | Severe:<br>slope.                                    | Severe:<br>slope.                               | Severe:<br>slope.                                  | Severe:<br>slope.                               | Poor:<br>slope.  |
| Enders-----              | Severe:<br>percs slowly,<br>slope.                   | Severe:<br>slope.                               | Severe:<br>depth to rock,<br>slope,<br>too clayey. | Severe:<br>slope.                               | Poor:<br>too clayey,<br>hard to pack,<br>slope.        |
| Mountainburg-----        | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>seepage,<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>seepage,<br>slope.    | Severe:<br>depth to rock,<br>seepage,<br>slope. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 35: *<br>Nella-----      | Moderate:<br>percs slowly,<br>slope.                 | Severe:<br>slope.                               | Moderate:<br>slope,<br>too clayey.                 | Moderate:<br>slope.                             | Fair:<br>small stones.                                 |
| Mountainburg-----        | Severe:<br>depth to rock,<br>large stones.           | Severe:<br>seepage,<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>seepage.              | Severe:<br>depth to rock,<br>seepage.           | Poor:<br>area reclaim,<br>small stones,<br>thin layer. |
| 36: *<br>Nella-----      | Severe:<br>slope.                                    | Severe:<br>slope.                               | Severe:<br>slope.                                  | Severe:<br>slope.                               | Poor:<br>slope.  |
| Mountainburg-----        | Severe:<br>depth to rock,<br>slope,<br>large stones. | Severe:<br>seepage,<br>depth to rock,<br>slope. | Severe:<br>depth to rock,<br>seepage,<br>slope.    | Severe:<br>depth to rock,<br>seepage,<br>slope. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |

See footnote at end of table.

TABLE 12.--SANITARY FACILITIES--Continued

| Map symbol and soil name | Septic tank absorption fields                   | Sewage lagoon areas               | Trench sanitary landfill                      | Area sanitary landfill         | Daily cover for landfill                          |
|--------------------------|---|-----------------------------------|---|--------------------------------|---|
| 37, 38-----<br>Pickwick  | Moderate:<br>percs slowly.                      | Moderate:<br>seepage,<br>slope.   | Moderate:<br>too clayey.                      | Slight-----                    | Fair:<br>too clayey.                              |
| 39-----<br>Rilla         | Moderate:<br>wetness,<br>percs slowly.          | Moderate:<br>seepage,<br>wetness. | Severe:<br>wetness.                           | Moderate:<br>wetness.          | Poor:<br>thin layer.                              |
| 40-----<br>Roellen       | Severe:<br>wetness,<br>percs slowly.            | Severe:<br>wetness.               | Severe:<br>wetness,<br>too clayey.            | Severe:<br>wetness.            | Poor:<br>too clayey,<br>hard to pack,<br>wetness. |
| 41-----<br>Roellen       | Severe:<br>floods,<br>wetness,<br>percs slowly. | Severe:<br>floods,<br>wetness.    | Severe:<br>floods,<br>wetness,<br>too clayey. | Severe:<br>floods,<br>wetness. | Poor:<br>too clayey,<br>hard to pack,<br>wetness. |
| 42-----<br>Roxana        | Moderate:<br>wetness,<br>percs slowly.          | Moderate:<br>seepage.             | Severe:<br>wetness.                           | Moderate:<br>wetness.          | Fair:<br>thin layer.                              |
| 43-----<br>Roxana        | Severe:<br>floods.                              | Severe:<br>floods.                | Severe:<br>floods,<br>wetness.                | Severe:<br>floods.             | Fair:<br>thin layer.                              |
| 44-----<br>Spadra        | Severe:<br>floods.                              | Severe:<br>floods.                | Severe:<br>floods.                            | Severe:<br>floods.             | Good.   |
| 45:*<br>Spadra-----      | Severe:<br>floods.                              | Severe:<br>floods.                | Severe:<br>floods.                            | Severe:<br>floods.             | Good.   |
| Ceda-----                | Severe:<br>floods,<br>poor filter.              | Severe:<br>seepage,<br>floods.    | Severe:<br>floods,<br>seepage.                | Severe:<br>floods,<br>seepage. | Poor:<br>small stones,<br>seepage.                |
| 46-----<br>Taft          | Severe:<br>wetness,<br>percs slowly.            | Severe:<br>wetness.               | Severe:<br>wetness.                           | Severe:<br>wetness.            | Poor:<br>wetness.                                 |
| 47.*<br>Udorthents       |   |                                   |   |                                |   |
| 48-----<br>Wrightsville  | Severe:<br>wetness,<br>percs slowly.            | Severe:<br>wetness.               | Severe:<br>wetness,<br>too clayey.            | Severe:<br>wetness.            | Poor:<br>too clayey,<br>hard to pack,<br>wetness. |

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

| Map symbol and soil name | Roadfill   | Sand  | Gravel  | Topsoil  |
|--------------------------|--|---|---|--|
| 1-----<br>Barling        | Fair:<br>wetness.                                      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Good.  |
| 2, 3-----<br>Bruno       | Good-----  | Probable-----                                 | Improbable:<br>too sandy.                     | Poor:<br>thin layer.                                   |
| 4-----<br>Cane           | Fair:<br>wetness.                                      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>small stones,<br>thin layer.                  |
| 5, 6-----<br>Dardanelle  | Poor:<br>low strength.                                 | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Good.  |
| 7, 8-----<br>Enders      | Poor:<br>low strength,<br>shrink-swell.                | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer.                                   |
| 9-----<br>Enders         | Poor:<br>low strength,<br>slope,<br>shrink-swell.      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>slope,<br>thin layer.                         |
| 10:*<br>Enders-----      | Poor:<br>low strength,<br>shrink-swell.                | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer.                                   |
| Mountainburg-----        | Poor:<br>area reclaim,<br>large stones,<br>thin layer. | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>thin layer. |
| 11:*<br>Enders-----      | Poor:<br>low strength,<br>slope,<br>shrink-swell.      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer,<br>slope.                         |
| Mountainburg-----        | Poor:<br>area reclaim,<br>large stones,<br>slope.      | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 12-----<br>Guthrie       | Poor:<br>low strength,<br>wetness.                     | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>wetness.                                      |
| 13, 14-----<br>Leadvale  | Fair:<br>area reclaim,<br>low strength,<br>thin layer. | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>thin layer.                                   |
| 15:*<br>Leesburg-----    | Poor:<br>slope.  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim,<br>slope.      |
| Enders-----              | Poor:<br>low strength,<br>slope,<br>shrink-swell.      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer,<br>slope.                         |

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

| Map symbol and soil name    | Roadfill   | Sand  | Gravel  | Topsoil  |
|-----------------------------|--|---|---|--|
| 16, 17, 18-----<br>Linker   | Poor:<br>area reclaim.                                 | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones.                                 |
| 19,* 20:*<br>Linker-----    | Poor:<br>area reclaim.                                 | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones.                                 |
| Mountainburg-----           | Poor:<br>thin layer,<br>area reclaim.                  | Improbable:<br>excess fines.                  | Improbable:<br>thin layer.                    | Poor:<br>small stones,<br>area reclaim.                |
| 21-----<br>McKamie          | Poor:<br>low strength,<br>shrink-swell.                | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer.                                   |
| 22-----<br>Moreland         | Poor:<br>low strength,<br>wetness,<br>shrink-swell.    | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>too clayey,<br>wetness.                       |
| 23, 24-----<br>Mountainburg | Poor:<br>thin layer,<br>area reclaim.                  | Improbable:<br>excess fines.                  | Improbable:<br>thin layer.                    | Poor:<br>small stones,<br>area reclaim.                |
| 25-----<br>Mountainburg     | Poor:<br>area reclaim,<br>large stones,<br>thin layer. | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>thin layer. |
| 26-----<br>Mountainburg     | Poor:<br>area reclaim,<br>large stones,<br>slope.      | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 27, 28-----<br>Muskogee     | Poor:<br>low strength,<br>shrink-swell.                | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>thin layer.                                   |
| 29, 30-----<br>Nella        | Good-----  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim.                |
| 31-----<br>Nella            | Fair:<br>slope.  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim,<br>slope.      |
| 32:*<br>Nella-----          | Good-----  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim.                |
| Enders-----                 | Poor:<br>low strength,<br>shrink-swell.                | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer.                                   |
| 33:*<br>Nella-----          | Poor:<br>slope.  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim,<br>slope.      |
| Enders-----                 | Poor:<br>low strength,<br>slope,<br>shrink-swell.      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer,<br>slope.                         |

See footnote at end of table.



TABLE 13.--CONSTRUCTION MATERIALS--Continued

| Map symbol and soil name | Roadfill   | Sand  | Gravel  | Topsoil  |
|--------------------------|--|---|---|--|
| 34:*                     |  |   |   |  |
| Nella-----               | Poor:<br>slope.  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim,<br>slope.      |
| Enders-----              | Poor:<br>low strength,<br>slope,<br>shrink-swell.      | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>slope,<br>thin layer.                         |
| Mountainburg-----        | Poor:<br>area reclaim,<br>large stones,<br>slope.      | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 35:*                     |  |   |   |  |
| Nella-----               | Good-----  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim.                |
| Mountainburg-----        | Poor:<br>area reclaim,<br>large stones,<br>thin layer. | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>thin layer. |
| 36:*                     |  |   |   |  |
| Nella-----               | Poor:<br>slope.  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>small stones,<br>area reclaim,<br>slope.      |
| Mountainburg-----        | Poor:<br>area reclaim,<br>large stones,<br>slope.      | Improbable:<br>excess fines,<br>large stones. | Improbable:<br>excess fines,<br>large stones. | Poor:<br>area reclaim,<br>small stones,<br>slope.      |
| 37, 38-----              |  |   |   |  |
| Pickwick-----            | Poor:<br>low strength.                                 | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>area reclaim.                                 |
| 39-----                  |  |   |   |  |
| Rilla-----               | Poor:<br>low strength.                                 | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>thin layer.                                   |
| 40, 41-----              |  |   |   |  |
| Roellen-----             | Poor:<br>low strength,<br>wetness,<br>shrink-swell.    | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>too clayey,<br>wetness.                       |
| 42, 43-----              |  |   |   |  |
| Roxana-----              | Fair:<br>thin layer.                                   | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Good.  |
| 44-----                  |  |   |   |  |
| Spadra-----              | Good-----  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>small stones.                                 |
| 45:*                     |  |   |   |  |
| Spadra-----              | Good-----  | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Fair:<br>small stones.                                 |
| Ceda-----                | Good-----  | Improbable:<br>small stones.                  | Probable-----                                 | Poor:<br>small stones,<br>area reclaim.                |
| 46-----                  |  |   |   |  |
| Taft-----                | Poor:<br>low strength.                                 | Improbable:<br>excess fines.                  | Improbable:<br>excess fines.                  | Poor:<br>thin layer.                                   |
| 47:*                     |  |   |   |  |
| Udorthents-----          |  |   |   |  |

See footnote at end of table.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

| Soil name and<br>map symbol | Roadfill  | Sand                         | Gravel                       | Topsoil                          |
|-----------------------------|---|------------------------------|------------------------------|----------------------------------|
| 48-----<br>Wrightsville     | Poor:<br>low strength,<br>wetness,<br>shrink-swell. | Improbable:<br>excess fines. | Improbable:<br>excess fines. | Poor:<br>thin layer,<br>wetness. |

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

| Map symbol and soil name | Limitations for--                      |                                   | Features affecting-- |                                       |  |   |
|--------------------------|--|-----------------------------------|----------------------|---------------------------------------|--|---|
|                          | Pond reservoir areas                   | Embankments, dikes, and levees    | Drainage             | Irrigation                            | Terraces and diversions                | Grassed waterways                           |
| 1-----<br>Barling        | Moderate: seepage.                     | Severe: piping.                   | Floods-----          | Wetness, erodes easily, floods.       | Erodes easily, wetness.                | Wetness.                                    |
| 2, 3-----<br>Bruno       | Severe: seepage.                       | Severe: seepage, piping.          | Deep to water        | Droughty, fast intake.                | Too sandy-----                         | Droughty.                                   |
| 4-----<br>Cane           | Slight-----                            | Severe: piping.                   | Percs slowly, slope. | Wetness, percs slowly, rooting depth. | Erodes easily, wetness, rooting depth. | Erodes easily, rooting depth.               |
| 5, 6-----<br>Dardanelle  | Moderate: seepage.                     | Severe: piping.                   | Deep to water        | Erodes easily                         | Erodes easily                          | Favorable.                                  |
| 7-----<br>Enders         | Moderate: depth to rock.               | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                  | Erodes easily, percs slowly.           | Erodes easily, percs slowly.                |
| 8-----<br>Enders         | Moderate: depth to rock.               | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                  | Slope, erodes easily, percs slowly.    | Slope, erodes easily, percs slowly.         |
| 9-----<br>Enders         | Severe: slope.                         | Moderate: hard to pack.           | Deep to water        | Percs slowly, slope, erodes easily.   | Slope, erodes easily, percs slowly.    | Slope, erodes easily, percs slowly.         |
| 10:*<br>Enders-----      | Moderate: depth to rock.               | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                  | Slope, erodes easily, percs slowly.    | Slope, erodes easily, percs slowly.         |
| Mountainburg-----        | Severe: depth to rock, slope, seepage. | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock.   | Slope, large stones, depth to rock.    | Large stones, slope, droughty.              |
| 11*:<br>Enders-----      | Severe: slope.                         | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                  | Slope, erodes easily, percs slowly.    | Slope, erodes easily, percs slowly.         |
| Mountainburg-----        | Severe: depth to rock, slope, seepage. | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock.   | Slope, large stones, depth to rock.    | Large stones, slope, droughty.              |
| 12-----<br>Guthrie       | Slight-----                            | Severe: piping, wetness.          | Percs slowly---      | Wetness, percs slowly, rooting depth. | Erodes easily, wetness, rooting depth. | Wetness, rooting depth.                     |
| 13-----<br>Leadvale      | Moderate: seepage, depth to rock.      | Severe: piping.                   | Percs slowly---      | Wetness, percs slowly, rooting depth. | Erodes easily, wetness, rooting depth. | Erodes easily, rooting depth, percs slowly. |
| 14-----<br>Leadvale      | Moderate: seepage, depth to rock.      | Severe: piping.                   | Percs slowly, slope. | Wetness, percs slowly, rooting depth. | Erodes easily, wetness, rooting depth. | Erodes easily, rooting depth, percs slowly. |
| 15*:<br>Leesburg-----    | Severe: slope.                         | Moderate: piping.                 | Deep to water        | Slope-----                            | Slope-----                             | Slope.                                      |
| Enders-----              | Severe: slope.                         | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                  | Slope, erodes easily, percs slowly.    | Slope, erodes easily, percs slowly.         |

See footnote at end of table.

TABLE 14.--WATER MANAGEMENT--Continued

| Map symbol and soil name | Limitations for--                      |                                   | Features affecting-- |                                       |                                       |  |
|--------------------------|--|-----------------------------------|----------------------|---------------------------------------|---------------------------------------|--|
|                          | Pond reservoir areas                   | Embankments, dikes, and levees    | Drainage             | Irrigation                            | Terraces and diversions               | Grassed waterways                      |
| 16-----<br>Linker        | Moderate: seepage, depth to rock.      | Severe: piping.                   | Deep to water        | Depth to rock                         | Depth to rock                         | Depth to rock.                         |
| 17-----<br>Linker        | Moderate: seepage, depth to rock.      | Severe: piping.                   | Deep to water        | Depth to rock, slope.                 | Depth to rock                         | Depth to rock.                         |
| 18-----<br>Linker        | Moderate: seepage, depth to rock.      | Severe: piping.                   | Deep to water        | Depth to rock, slope.                 | Slope, depth to rock.                 | Slope, depth to rock.                  |
| 19:*<br>Linker-----      | Moderate: seepage, depth to rock.      | Severe: piping.                   | Deep to water        | Depth to rock, slope.                 | Depth to rock                         | Depth to rock.                         |
| Mountainburg----         | Severe: depth to rock, seepage.        | Severe: thin layer, seepage.      | Deep to water        | Droughty, depth to rock, slope.       | Large stones, depth to rock.          | Large stones, droughty, depth to rock. |
| 20:*<br>Linker-----      | Moderate: seepage, depth to rock.      | Severe: piping.                   | Deep to water        | Depth to rock, slope.                 | Slope, depth to rock.                 | Slope, depth to rock.                  |
| Mountainburg----         | Severe: depth to rock, seepage, slope. | Severe: thin layer, seepage.      | Deep to water        | Droughty, depth to rock, slope.       | Large stones, depth to rock, slope.   | Large stones, droughty, depth to rock. |
| 21-----<br>McKamie       | Slight-----                            | Moderate: shrink-swell.           | Deep to water        | Slope, erodes easily, slow intake.    | Erodes easily, percs slowly.          | Favorable.                             |
| 22-----<br>Moreland      | Slight-----                            | Severe: hard to pack, wetness.    | Percs slowly---      | Wetness, slow intake, percs slowly.   | Wetness, percs slowly.                | Wetness, percs slowly.                 |
| 23-----<br>Mountainburg  | Severe: depth to rock, seepage.        | Severe: thin layer, seepage.      | Deep to water        | Droughty, depth to rock, slope.       | Large stones, depth to rock.          | Large stones, droughty, depth to rock. |
| 24-----<br>Mountainburg  | Severe: depth to rock, seepage.        | Severe: thin layer, seepage.      | Deep to water        | Droughty, depth to rock, slope.       | Large stones, depth to rock, slope.   | Large stones, droughty, depth to rock. |
| 25-----<br>Mountainburg  | Severe: depth to rock, seepage.        | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock.   | Large stones, depth to rock.          | Large stones, droughty, depth to rock. |
| 26-----<br>Mountainburg  | Severe: depth to rock, slope, seepage. | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock.   | Slope, large stones, depth to rock.   | Large stones, slope, droughty.         |
| 27-----<br>Muskogee      | Slight-----                            | Moderate: hard to pack, wetness.  | Percs slowly---      | Wetness, percs slowly, erodes easily. | Erodes easily, wetness, percs slowly. | Wetness, erodes easily, percs slowly.  |
| 28-----<br>Muskogee      | Slight-----                            | Moderate: hard to pack, wetness.  | Percs slowly, slope. | Wetness, percs slowly, slope.         | Erodes easily, wetness, percs slowly. | Wetness, erodes easily, percs slowly.  |
| 29-----<br>Nella         | Moderate: seepage.                     | Severe: piping.                   | Deep to water        | Droughty, slope.                      | Large stones---                       | Large stones, droughty.                |

See footnote at end of table.



TABLE 14.--WATER MANAGEMENT--Continued

| Map symbol and soil name | Limitations for--                      |                                   | Features affecting-- |                                     |                                     |                                     |
|--------------------------|--|-----------------------------------|----------------------|-------------------------------------|-------------------------------------|-------------------------------------|
|                          | Pond reservoir areas                   | Embankments, dikes, and levees    | Drainage             | Irrigation                          | Terraces and diversions             | Grassed waterways                   |
| 30, 31-----<br>Nella     | Moderate: seepage.                     | Severe: piping.                   | Deep to water        | Droughty, slope.                    | Slope, large stones.                | Large stones, slope, droughty.      |
| 32*-----<br>Nella        | Moderate: seepage.                     | Severe: piping.                   | Deep to water        | Droughty, slope.                    | Slope, large stones.                | Large stones, slope, droughty.      |
| Enders-----              | Moderate: depth to rock.               | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                | Slope, erodes easily, percs slowly. | Slope, erodes easily, percs slowly. |
| 33:*-----<br>Nella       | Severe: slope.                         | Severe: piping.                   | Deep to water        | Droughty, slope.                    | Slope, large stones.                | Large stones, slope, droughty.      |
| Enders-----              | Severe: slope.                         | Severe: hard to pack.             | Deep to water        | Percs slowly, slope.                | Slope, erodes easily, percs slowly. | Slope, erodes easily, percs slowly. |
| 34:*-----<br>Nella       | Severe: slope.                         | Severe: piping.                   | Deep to water        | Droughty: slope.                    | Slope, large stones.                | Large stones, slope, droughty.      |
| Enders-----              | Severe: slope.                         | Moderate: hard to pack.           | Deep to water        | Percs slowly, slope, erodes easily. | Slope, erodes easily, percs slowly. | Slope, erodes easily, percs slowly. |
| Mountainburg-----        | Severe: depth to rock, slope, seepage. | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock. | Slope, large stones, depth to rock. | Large stones, slope, droughty.      |
| 35:*-----<br>Nella       | Moderate: seepage.                     | Severe: piping.                   | Deep to water        | Droughty, slope.                    | Slope, large stones.                | Large stones, slope, droughty.      |
| Mountainburg-----        | Severe: depth to rock, slope, seepage. | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock. | Slope, large stones, depth to rock. | Large stones, slope, droughty.      |
| 36:*-----<br>Nella       | Severe: slope.                         | Severe: piping.                   | Deep to water        | Droughty, slope.                    | Slope, large stones.                | Large stones, slope, droughty.      |
| Mountainburg-----        | Severe: depth to rock, slope, seepage. | Severe: large stones, thin layer. | Deep to water        | Slope, large stones, depth to rock. | Slope, large stones, depth to rock. | Large stones, slope, droughty.      |
| 37-----<br>Pickwick      | Moderate: seepage.                     | Moderate: piping.                 | Deep to water        | Erodes easily                       | Erodes easily                       | Erodes easily.                      |
| 38-----<br>Pickwick      | Moderate: seepage.                     | Moderate: piping.                 | Deep to water        | Slope, erodes easily.               | Erodes easily                       | Erodes easily.                      |
| 39-----<br>Rilla         | Moderate: seepage.                     | Severe: thin layer.               | Deep to water        | Erodes easily                       | Erodes easily                       | Erodes easily.                      |

See footnote at end of page.

TABLE 14.--WATER MANAGEMENT--Continued

| Map symbol and soil name | Limitations for--       |                                | Features affecting--  |                                       |  |                         |
|--------------------------|-------------------------|--------------------------------|-----------------------|---------------------------------------|--|-------------------------|
|                          | Pond reservoir areas    | Embankments, dikes, and levees | Drainage              | Irrigation                            | Terraces and diversions                | Grassed waterways       |
| 40-----<br>Roellen       | Moderate: seepage.      | Severe: hard to pack, wetness. | Percs slowly---       | Wetness, slow intake, percs slowly.   | Erodes easily, wetness, percs slowly.  | Wetness, percs slowly.  |
| 41-----<br>Roellen       | Moderate: seepage.      | Severe: hard to pack, wetness. | Percs slowly, floods. | Wetness, slow intake, percs slowly.   | Erodes easily, wetness, percs slowly.  | Wetness, percs slowly.  |
| 42, 43-----<br>Roxana    | Moderate: seepage.      | Severe: piping.                | Deep to water         | Erodes easily                         | Erodes easily                          | Favorable.              |
| 44-----<br>Spadra        | Moderate: seepage.      | Severe: piping.                | Deep to water         | Erodes easily                         | Erodes easily                          | Erodes easily.          |
| 45:*<br>Spadra-----      | Moderate: seepage.      | Severe: piping.                | Deep to water         | Erodes easily                         | Erodes easily                          | Erodes easily.          |
| Ceda-----                | Severe: seepage.        | Severe: seepage.               | Deep to water         | Droughty-----                         | Favorable-----                         | Droughty.               |
| 46-----<br>Taft          | Slight-----<br>seepage. | Severe: piping.                | Percs slowly---       | Wetness, percs slowly, rooting depth. | Erodes easily, wetness, rooting depth. | Wetness, rooting depth. |
| 47.*<br>Udorthents       |                         |                                |                       |                                       |  |                         |
| 48-----<br>Wrightsville  | Slight-----             | Severe: hard to pack, wetness. | Percs slowly---       | Wetness, percs slowly, erodes easily. | Erodes easily, wetness, percs slowly.  | Wetness, percs slowly.  |

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 15.--ENGINEERING INDEX PROPERTIES

[Absence of an entry indicates that data were not estimated]

| Map symbol and soil name | Depth                         | USDA texture   | Classification   |                                  | Frag-<br>ments<br>> 3<br>inches<br>Pct | Percentage passing<br>sieve number-- |                                  |                                  |                                | Liquid<br>limit<br>Pct         | Plas-<br>ticity<br>index      |
|--------------------------|-------------------------------|--|--|----------------------------------|--|--------------------------------------|----------------------------------|----------------------------------|--------------------------------|--------------------------------|-------------------------------|
|                          |                               |  | Unified  | AASHTO                           |  | 4                                    | 10                               | 40                               | 200                            |                                |                               |
| 1-----<br>Barling        | 0-12<br>12-72                 | Silt loam-----<br>Silt loam, very<br>fine sandy loam.  | ML<br>ML, CL-ML  | A-4<br>A-4                       | 0<br>0                                 | 100<br>100                           | 100<br>100                       | 90-100<br>90-100                 | 70-90<br>70-90                 | <20<br><25                     | NP-3<br>NP-6                  |
| 2, 3-----<br>Bruno       | 0-6<br>6-72                   | Loamy fine sand<br>Sand, loamy fine<br>sand, fine sand.  | SM, ML<br>SP-SM, SM                                      | A-2, A-4<br>A-2                  | 0<br>0                                 | 100<br>100                           | 100<br>100                       | 60-85<br>60-80                   | 30-60<br>10-30                 | <25<br>---                     | NP-3<br>NP                    |
| 4-----<br>Cane           | 0-9<br>9-24<br>24-76          | Loam-----<br>Silty clay loam,<br>loam, clay loam.<br>Silty clay loam,<br>loam, clay loam.  | ML, SM,<br>CL-ML<br>ML, CL-ML,<br>CL<br>ML, CL-ML,<br>CL | A-4<br>A-4, A-6<br>A-4, A-6      | 0-2<br>0-2<br>0-2                      | 80-100<br>90-100<br>90-100           | 75-100<br>80-100<br>80-100       | 65-95<br>75-100<br>75-100        | 40-75<br>60-85<br>55-85        | <30<br>17-32<br>18-37          | NP-7<br>3-12<br>3-15          |
| 5, 6-----<br>Dardanelle  | 0-23<br>23-51<br>51-91        | Silt loam-----<br>Silt loam, silty<br>clay loam, clay<br>loam.<br>Silt loam, very<br>fine sandy loam,<br>loam.                           | ML, CL,<br>CL-ML<br>CL-ML, CL<br>ML, CL,<br>CL-ML        | A-4, A-6<br>A-4, A-6<br>A-4, A-6 | 0<br>0<br>0                            | 100<br>100<br>100                    | 100<br>100<br>100                | 100<br>100<br>100                | 85-100<br>80-100<br>80-100     | 16-30<br>23-38<br>16-38        | 3-11<br>6-15<br>3-15          |
| 7, 8-----<br>Enders      | 0-7<br>7-48<br>48-56<br>56-62 | Gravelly fine<br>sandy loam.<br>Silty clay, clay<br>Silty clay, shaly<br>silty clay.<br>Weathered<br>bedrock,<br>unweathered<br>bedrock. | ML, GM,<br>SM-SC,<br>CL-ML<br>CH<br>CH<br>---            | A-2, A-4<br>A-7<br>A-7<br>---    | 0-15<br>0<br>0-15<br>---               | 50-95<br>95-100<br>95-100<br>---     | 35-75<br>85-100<br>90-100<br>--- | 30-70<br>85-100<br>85-100<br>--- | 30-60<br>70-95<br>70-95<br>--- | 20-35<br>65-80<br>65-80<br>--- | 2-10<br>35-45<br>35-45<br>--- |
| 9-----<br>Enders         | 0-7<br>7-48<br>48-56<br>56-62 | Stony fine sandy<br>loam.<br>Silty clay, clay<br>Silty clay, shaly<br>silty clay.<br>Weathered<br>bedrock,<br>unweathered<br>bedrock.    | SM, ML,<br>SM-SC,<br>CL-ML<br>CH<br>CH<br>---            | A-4, A-2<br>A-7<br>A-7<br>---    | 20-40<br>0<br>0-15<br>---              | 80-90<br>95-100<br>95-100<br>---     | 70-80<br>85-100<br>85-100<br>--- | 65-75<br>85-100<br>85-100<br>--- | 30-60<br>70-95<br>70-95<br>--- | 20-35<br>50-65<br>50-65<br>--- | 2-10<br>30-40<br>30-40<br>--- |
| 10,* 11:*<br>Enders----- | 0-7<br>7-48<br>48-56<br>56-62 | Gravelly fine<br>sandy loam.<br>Silty clay, clay<br>Silty clay, shaly<br>silty clay.<br>Weathered<br>bedrock,<br>unweathered<br>bedrock. | ML, GM,<br>SM-SC,<br>CL-ML<br>CH<br>CH<br>---            | A-2, A-4<br>A-7<br>A-7<br>---    | 0-15<br>0<br>0-15<br>---               | 50-95<br>95-100<br>95-100<br>---     | 35-75<br>85-100<br>90-100<br>--- | 30-70<br>85-100<br>85-100<br>--- | 30-60<br>70-95<br>70-95<br>--- | 20-35<br>65-80<br>65-80<br>--- | 2-10<br>35-45<br>35-45<br>--- |

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

| Map symbol and soil name      | Depth<br>In | USDA texture   | Classification           |               | Frag-<br>ments<br>> 3<br>inches | Percentage passing<br>sieve number-- |        |        |       | Liquid<br>limit<br>Pct | Plas-<br>ticity<br>index |
|-------------------------------|-------------|--|--------------------------|---------------|---------------------------------|--------------------------------------|--------|--------|-------|------------------------|--------------------------|
|                               |             |  | Unified                  | AASHTO        |                                 | 4                                    | 10     | 40     | 200   |                        |                          |
| 10,* 11:*<br>Mountainburg---- | 0-6         | Stony fine sandy loam.   | GM                       | A-1, A-2      | 30-60                           | 40-50                                | 30-50  | 20-40  | 15-25 | <20                    | NP                       |
|                               | 6-15        | Very gravelly sandy clay loam, very gravelly loam, very stony fine sandy loam. | GM, GC, GM-GC            | A-1, A-2      | 30-65                           | 40-60                                | 30-50  | 25-50  | 20-30 | <30                    | NP-10                    |
|                               | 15-17       | Unweathered bedrock.   | ---                      | ---           | ---                             | ---                                  | ---    | ---    | ---   | ---                    | ---                      |
| 12-----<br>Guthrie            | 0-5         | Silt loam-----   | ML, CL-ML                | A-4           | 0                               | 100                                  | 100    | 90-100 | 85-95 | 18-28                  | 2-7                      |
|                               | 5-23        | Silt loam, silty clay loam.  | ML, CL-ML, CL            | A-4, A-6      | 0                               | 100                                  | 100    | 90-100 | 85-95 | 23-39                  | 5-15                     |
|                               | 23-74       | Silty clay loam, silt loam.  | CL, ML, CL-ML            | A-6, A-7, A-4 | 0-5                             | 90-100                               | 85-100 | 80-100 | 70-95 | 20-50                  | 4-25                     |
| 13, 14-----<br>Leadvale       | 0-6         | Silt loam-----   | ML, CL-ML, CL            | A-4           | 0                               | 100                                  | 95-100 | 85-95  | 65-85 | 18-32                  | 2-10                     |
|                               | 6-24        | Silt loam, silty clay loam.  | CL-ML, CL, ML            | A-4, A-6      | 0                               | 100                                  | 95-100 | 90-98  | 75-90 | 22-36                  | 3-14                     |
|                               | 24-56       | Silt loam, silty clay loam.  | CL-ML, CL, ML            | A-4, A-6, A-7 | 0                               | 100                                  | 95-100 | 80-98  | 70-90 | 23-42                  | 3-18                     |
|                               | 56-72       | Silty clay loam, silty clay.   | CL, MH, ML, CH           | A-6, A-7      | 0-5                             | 90-100                               | 90-100 | 85-95  | 70-90 | 32-58                  | 12-26                    |
| 15:*<br>Leesburg-----         | 0-6         | Gravelly loam----  | SM, GM, ML               | A-2, A-4, A-1 | 0-15                            | 60-85                                | 55-80  | 40-65  | 15-55 | <20                    | NP                       |
|                               | 6-24        | Gravelly loam, gravelly clay loam.   | SM, ML, CL-ML, CL        | A-4           | 0-15                            | 65-85                                | 55-80  | 45-70  | 40-60 | <30                    | NP-10                    |
|                               | 24-72       | Gravelly clay loam, gravelly loam, gravelly sandy clay loam.                   | SC, CL, GC               | A-4, A-6      | 0-15                            | 65-85                                | 55-80  | 35-75  | 40-65 | 26-40                  | 8-20                     |
| Enders-----                   | 0-7         | Gravelly fine sandy loam.  | ML, SM, GM, SM-SC, CL-ML | A-2, A-4      | 0-15                            | 50-95                                | 35-75  | 30-70  | 30-60 | 20-35                  | 2-10                     |
|                               | 7-48        | Silty clay, clay   | CH                       | A-7           | 0                               | 95-100                               | 85-100 | 85-100 | 70-95 | 65-80                  | 35-45                    |
|                               | 48-56       | Silty clay, stony silty clay.  | CH                       | A-7           | 0-15                            | 95-100                               | 90-100 | 85-100 | 70-95 | 65-80                  | 35-45                    |
|                               | 56-62       | Weathered bedrock, unweathered bedrock.  | ---                      | ---           | ---                             | ---                                  | ---    | ---    | ---   | ---                    | ---                      |
| 16, 17, 18-----<br>Linker     | 0-5         | Fine sandy loam  | SM, ML, CL-ML, SM-SC     | A-4           | 0                               | 85-100                               | 80-100 | 70-100 | 40-70 | <30                    | NP-7                     |
|                               | 5-25        | Fine sandy loam, sandy clay loam, loam.  | CL, SC, SM, ML           | A-4, A-6      | 0-10                            | 90-100                               | 80-100 | 70-100 | 40-80 | <40                    | NP-18                    |
|                               | 25-35       | Gravelly sandy clay loam, gravelly fine sandy loam, sandy clay loam.           | CL, SC, GC, ML           | A-4, A-6      | 0-10                            | 65-100                               | 60-100 | 55-100 | 40-80 | <40                    | NP-18                    |
|                               | 35-37       | Unweathered bedrock.   | ---                      | ---           | ---                             | ---                                  | ---    | ---    | ---   | ---                    | ---                      |

See footnote at end of table.



TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

| Map symbol and soil name    | Depth | USDA texture   | Classification             |               | Frag-<br>ments<br>> 3<br>inches | Percentage passing<br>sieve number-- |        |        |        | Liquid<br>limit | Plas-<br>ticity<br>index |
|-----------------------------|-------|--|----------------------------|---------------|---------------------------------|--------------------------------------|--------|--------|--------|-----------------|--------------------------|
|                             |       |  | Unified                    | AASHTO        |                                 | 4                                    | 10     | 40     | 200    |                 |                          |
|                             | In    |  |                            |               | Pct                             |                                      |        |        |        | Pct             |                          |
| 19,* 20:*<br>Linker-----    | 0-5   | Fine sandy loam  | SM, ML,<br>CL-ML<br>SM-SC  | A-4           | 0                               | 85-100                               | 80-100 | 70-100 | 40-70  | <30             | NP-7                     |
|                             | 5-25  | Fine sandy loam,<br>sandy clay loam,<br>loam.  | CL, SC,<br>SM, ML          | A-4, A-6      | 0-10                            | 90-100                               | 80-100 | 70-100 | 40-80  | <40             | NP-18                    |
|                             | 25-35 | Gravelly sandy<br>clay loam,<br>gravelly fine<br>sandy loam,<br>sandy clay loam.                 | CL, SC,<br>GC, ML          | A-4, A-6      | 0-10                            | 65-100                               | 60-100 | 55-100 | 40-80  | <40             | NP-18                    |
|                             | 35-37 | Unweathered<br>bedrock.  | ---                        | ---           | ---                             | ---                                  | ---    | ---    | ---    | ---             | ---                      |
| Mountainburg----            | 0-6   | Gravelly fine<br>sandy loam.   | GM, SM                     | A-1, A-2      | 0-15                            | 60-80                                | 50-70  | 20-40  | 15-30  | ---             | NP                       |
|                             | 6-15  | Very gravelly<br>sandy clay loam,<br>very gravelly<br>fine sandy loam,<br>very gravelly<br>loam. | GM, GC,<br>GP-GM,<br>GM-GC | A-1, A-2      | 15-30                           | 40-60                                | 30-50  | 25-50  | 10-25  | <30             | NP-10                    |
|                             | 15-17 | Unweathered<br>bedrock.  | ---                        | ---           | ---                             | ---                                  | ---    | ---    | ---    | ---             | ---                      |
| 21-----<br>McKamie          | 0-4   | Very fine sandy<br>loam.   | CL, CL-ML                  | A-6, A-4      | 0                               | 100                                  | 100    | 95-100 | 80-100 | 20-40           | 5-22                     |
|                             | 4-42  | Clay, silty clay   | CH, CL                     | A-7-6         | 0                               | 100                                  | 100    | 95-100 | 80-100 | 45-70           | 22-40                    |
|                             | 42-56 | Silty clay loam,<br>silt loam, clay<br>loam.   | CL, CL-ML                  | A-4, A-6      | 0                               | 100                                  | 90-100 | 85-100 | 50-95  | 20-40           | 5-22                     |
| 22-----<br>Moreland         | 0-20  | Silty clay-----  | CH                         | A-7-6         | 0                               | 100                                  | 95-100 | 90-100 | 90-100 | 51-74           | 25-45                    |
|                             | 20-46 | Clay, silty clay   | CH                         | A-7-6         | 0                               | 100                                  | 95-100 | 90-100 | 90-100 | 51-74           | 25-45                    |
|                             | 46-72 | Clay, silty clay<br>loam, silty<br>clay.   | CH, CL                     | A-7-6,<br>A-6 | 0                               | 100                                  | 100    | 100    | 90-100 | 35-74           | 25-45                    |
| 23, 24-----<br>Mountainburg | 0-6   | Gravelly fine<br>sandy loam.   | GM, SM                     | A-1, A-2      | 0-15                            | 60-80                                | 50-70  | 20-40  | 15-30  | ---             | NP                       |
|                             | 6-15  | Very gravelly<br>sandy clay loam,<br>very gravelly<br>fine sandy loam,<br>very gravelly<br>loam. | GM, GC,<br>GP-GM,<br>GM-GC | A-1, A-2      | 15-30                           | 40-60                                | 30-50  | 25-50  | 10-25  | <30             | NP-10                    |
|                             | 15    | Unweathered<br>bedrock.  | ---                        | ---           | ---                             | ---                                  | ---    | ---    | ---    | ---             | ---                      |
| 25, 26-----<br>Mountainburg | 0-6   | Stony fine sandy<br>loam.  | GM                         | A-1, A-2      | 30-60                           | 40-50                                | 30-50  | 20-40  | 15-25  | <20             | NP                       |
|                             | 6-15  | Very gravelly<br>sandy clay loam,<br>very gravelly<br>loam, very stony<br>fine sandy loam.       | GM, GC,<br>GM-GC           | A-1, A-2      | 30-65                           | 40-60                                | 30-50  | 25-50  | 20-30  | <30             | NP-10                    |
|                             | 15-17 | Unweathered<br>bedrock.  | ---                        | ---           | ---                             | ---                                  | ---    | ---    | ---    | ---             | ---                      |
| 27, 28-----<br>Muskogee     | 0-10  | Silt loam-----   | ML, CL,<br>CL-ML           | A-4           | 0                               | 100                                  | 100    | 95-100 | 85-100 | 18-30           | 1-10                     |
|                             | 10-25 | Silty clay loam,<br>silt loam.   | CL, CH                     | A-6,<br>A-7-6 | 0                               | 100                                  | 100    | 95-100 | 90-100 | 35-55           | 15-30                    |
|                             | 25-72 | Silty clay, clay   | CH                         | A-7-6         | 0                               | 100                                  | 100    | 95-100 | 90-100 | 55-70           | 30-40                    |

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

| Map symbol and soil name | Depth     | USDA texture   | Classification           |               | Frag-ments<br>> 3<br>inches | Percentage passing<br>sieve number-- |        |        |       | Liquid<br>limit<br>Pct | Plas-<br>ticity<br>index |
|--------------------------|-----------|--|--------------------------|---------------|-----------------------------|--------------------------------------|--------|--------|-------|------------------------|--------------------------|
|                          |           |  | Unified                  | AASHTO        |                             | 4                                    | 10     | 40     | 200   |                        |                          |
|                          | <u>In</u> |  |                          |               | <u>Pct</u>                  |                                      |        |        |       |                        |                          |
| 29, 30, 31-----<br>Nella | 0-17      | Gravelly fine sandy loam.  | ML, CL, GM, SM           | A-4, A-2      | 0-10                        | 65-90                                | 60-80  | 55-65  | 30-55 | <30                    | NP-8                     |
|                          | 17-72     | Clay loam, gravelly clay loam, gravelly sandy clay loam.                       | CL, SC, CL-ML, SM-SC     | A-4, A-6, A-2 | 0-30                        | 75-95                                | 60-90  | 45-70  | 30-60 | 25-40                  | 6-20                     |
| 32,* 33:*<br>Nella-----  | 0-17      | Gravelly fine sandy loam.  | ML, CL, GM, SM           | A-4, A-2      | 0-10                        | 65-90                                | 60-80  | 55-65  | 30-55 | <30                    | NP-8                     |
|                          | 17-72     | Clay loam, gravelly clay loam, gravelly sandy clay loam.                       | CL, SC, CL-ML, SM-SC     | A-4, A-6, A-2 | 0-30                        | 75-95                                | 60-90  | 45-70  | 30-60 | 25-40                  | 6-20                     |
| Enders-----              | 0-7       | Gravelly fine sandy loam.  | ML, SM, GM, SM-SC, CL-ML | A-2, A-4      | 0-15                        | 50-95                                | 35-75  | 30-70  | 30-60 | 20-35                  | 2-10                     |
|                          | 7-48      | Silty clay, clay   | CH                       | A-7           | 0                           | 95-100                               | 85-100 | 85-100 | 70-95 | 65-80                  | 35-45                    |
|                          | 48-56     | Silty clay, shaly silty clay.  | CH                       | A-7           | 0-15                        | 95-100                               | 90-100 | 85-100 | 70-95 | 65-80                  | 35-45                    |
|                          | 56-62     | Weathered bedrock, unweathered bedrock.  | ---                      | ---           | ---                         | ---                                  | ---    | ---    | ---   | ---                    | ---                      |
| 34:*<br>Nella-----       | 0-17      | Stony fine sandy loam.   | ML, CL, SM, SC           | A-4           | 10-30                       | 90-100                               | 85-90  | 65-75  | 36-55 | <30                    | NP-8                     |
|                          | 17-72     | Gravelly clay loam, stony sandy clay loam, gravelly sandy clay loam.           | CL, SC, CL-ML, SM-SC     | A-4, A-6, A-2 | 0-30                        | 75-95                                | 60-90  | 45-70  | 30-60 | 25-40                  | 6-20                     |
| Enders-----              | 0-7       | Stony fine sandy loam.   | SM, ML, SM-SC, CL-ML     | A-4, A-2      | 20-40                       | 80-90                                | 70-80  | 65-75  | 30-60 | 20-35                  | 2-10                     |
|                          | 7-48      | Silty clay, clay   | CH                       | A-7           | 0                           | 95-100                               | 85-100 | 85-100 | 70-95 | 50-65                  | 30-40                    |
|                          | 48-56     | Silty clay, shaly silty clay.  | CH                       | A-7           | 0-15                        | 95-100                               | 85-100 | 85-100 | 70-95 | 50-65                  | 30-40                    |
|                          | 56-62     | Weathered bedrock, unweathered bedrock.  | ---                      | ---           | ---                         | ---                                  | ---    | ---    | ---   | ---                    | ---                      |
| Mountainburg----         | 0-6       | Stony fine sandy loam.   | GM                       | A-1, A-2      | 30-60                       | 40-50                                | 30-50  | 20-40  | 15-25 | <20                    | NP                       |
|                          | 6-15      | Very gravelly sandy clay loam, very gravelly loam, very stony fine sandy loam. | GM, GC, GM-GC            | A-1, A-2      | 30-65                       | 40-60                                | 30-50  | 25-50  | 20-30 | <30                    | NP-10                    |
|                          | 15-17     | Unweathered bedrock.   | ---                      | ---           | ---                         | ---                                  | ---    | ---    | ---   | ---                    | ---                      |
| 35,* 36:*<br>Nella-----  | 0-17      | Gravelly fine sandy loam.  | ML, CL, GM, SM           | A-4, A-2      | 0-10                        | 65-90                                | 60-80  | 55-65  | 30-55 | <30                    | NP-8                     |
|                          | 17-72     | Cobbly clay loam, gravelly clay loam, cobbly sandy clay loam.                  | CL, SC, CL-ML, SM-SC     | A-4, A-6, A-2 | 0-30                        | 75-95                                | 60-90  | 45-70  | 30-60 | 25-40                  | 6-20                     |

See footnote at end of table.



TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

| Map symbol and soil name | Depth | USDA texture   | Classification       |                   | Frag-<br>ments<br>> 3<br>inches<br>Pct | Percentage passing<br>sieve number-- |        |        |        | Liquid<br>limit<br>Pct | Plas-<br>ticity<br>index |
|--------------------------|-------|--|----------------------|-------------------|--|--------------------------------------|--------|--------|--------|------------------------|--------------------------|
|                          |       |  | Unified              | AASHTO            |  | 4                                    | 10     | 40     | 200    |                        |                          |
| 35,* 36:*                | In    |  |                      |                   |  |                                      |        |        |        |                        |                          |
| Mountainburg----         | 0-6   | Stony fine sandy loam.   | GM                   | A-1, A-2          | 30-60                                  | 40-50                                | 30-50  | 20-40  | 15-25  | <20                    | NP                       |
|                          | 6-15  | Very gravelly sandy clay loam, very gravelly loam, very stony fine sandy loam. | GM, GC, GM-GC        | A-1, A-2          | 30-65                                  | 40-60                                | 30-50  | 25-50  | 20-30  | <30                    | NP-10                    |
|                          | 15-17 | Unweathered bedrock.   | ---                  | ---               | ---                                    | ---                                  | ---    | ---    | ---    | ---                    | ---                      |
| 37, 38-----              | 0-6   | Silt loam-----   | ML, CL-ML, CL        | A-4, A-6          | 0                                      | 100                                  | 95-100 | 90-100 | 70-95  | 18-32                  | 2-11                     |
| Pickwick                 | 6-30  | Silty clay loam, silt loam.  | CL                   | A-6, A-7-6        | 0                                      | 95-100                               | 95-100 | 90-100 | 75-95  | 30-42                  | 11-17                    |
|                          | 30-72 | Silty clay loam, clay loam, clay.  | CL, ML, MH           | A-6, A-7-5, A-7-6 | 0-5                                    | 80-100                               | 75-100 | 65-95  | 55-80  | 33-52                  | 12-22                    |
| 39-----                  | 0-6   | Silt loam-----   | ML, CL-ML, CL        | A-4               | 0                                      | 100                                  | 100    | 100    | 90-100 | <31                    | NP-10                    |
| Rilla                    | 6-47  | Silty clay loam, clay loam, silt loam.   | CL                   | A-6, A-4          | 0                                      | 100                                  | 100    | 100    | 90-100 | 28-40                  | 8-17                     |
|                          | 47-72 | Loam, silty clay loam, silty clay.   | CL-ML, CL            | A-4, A-6, A-7-6   | 0                                      | 100                                  | 100    | 100    | 75-100 | 23-45                  | 4-21                     |
| 40, 41-----              | 0-11  | Clay-----  | CL, CH               | A-7               | 0                                      | 100                                  | 100    | 95-100 | 90-100 | 45-65                  | 20-40                    |
| Roellen                  | 11-42 | Clay, silty clay   | CH                   | A-7               | 0                                      | 100                                  | 100    | 95-100 | 90-100 | 55-80                  | 30-50                    |
|                          | 42-80 | Clay, silty clay, silty clay loam.   | CH, CL, CL-ML        | A-7, A-6, A-4     | 0                                      | 100                                  | 95-100 | 80-100 | 60-95  | 20-80                  | 6-50                     |
| 42, 43-----              | 0-6   | Silt loam-----   | ML, CL-ML            | A-4               | 0                                      | 100                                  | 100    | 85-100 | 50-75  | <27                    | NP-7                     |
| Roxana                   | 6-72  | Silt loam, very fine sandy loam, loamy very fine sand.                         | ML, CL-ML            | A-4               | 0                                      | 100                                  | 100    | 85-100 | 50-85  | <27                    | NP-7                     |
| 44-----                  | 0-6   | Loam-----  | ML, SM               | A-2, A-4          | 0                                      | 85-100                               | 80-100 | 65-80  | 30-75  | <20                    | NP-3                     |
| Spadra                   | 6-53  | Loam, sandy clay loam.   | CL, CL-ML, ML        | A-4, A-6          | 0                                      | 90-100                               | 90-100 | 80-95  | 55-75  | 25-40                  | 5-15                     |
|                          | 53-72 | Fine sandy loam, sandy loam, gravelly fine sandy loam.                         | ML, CL, SM, SC       | A-4, A-2, A-1     | 0                                      | 70-100                               | 70-100 | 40-85  | 20-65  | <30                    | NP-10                    |
| 45:*                     | 0-6   | Loam-----  | ML, SM               | A-2, A-4          | 0                                      | 85-100                               | 80-100 | 65-80  | 30-75  | <20                    | NP-3                     |
| Spadra                   | 6-53  | Loam, sandy clay loam.   | CL, CL-ML, ML        | A-4, A-6          | 0                                      | 90-100                               | 90-100 | 80-95  | 55-75  | 25-40                  | 5-15                     |
|                          | 53-72 | Fine sandy loam, sandy loam, gravelly fine sandy loam.                         | ML, CL, SM, SC       | A-4, A-2, A-1     | 0                                      | 70-100                               | 70-100 | 40-85  | 20-65  | <30                    | NP-10                    |
| Ceda-----                | 0-4   | Gravelly fine sandy loam.  | SM, GM, ML, SM-SC    | A-4, A-2          | 0-5                                    | 35-75                                | 35-75  | 25-70  | 15-70  | <30                    | NP-7                     |
|                          | 4-72  | Stratified very gravelly fine sandy loam or very gravelly loam.                | GP, GM, GP-GM, GM-GC | A-2, A-4          | 0-5                                    | 5-50                                 | 5-50   | 5-50   | 2-48   | <30                    | NP-7                     |

See footnote at end of table.

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

| Map symbol and soil name | Depth | USDA texture  | Classification           |                  | Frag-<br>ments<br>> 3<br>inches | Percentage passing<br>sieve number-- |        |        |        | Liquid<br>limit | Plas-<br>ticity<br>index |
|--------------------------|-------|---|--------------------------|------------------|---------------------------------|--------------------------------------|--------|--------|--------|-----------------|--------------------------|
|                          |       |   | Unified                  | AASHTO           |                                 | 4                                    | 10     | 40     | 200    |                 |                          |
|                          | In    |   |                          |                  | Pct                             |                                      |        |        |        | Pct             |                          |
| 46-----<br>Taft          | 0-11  | Silt loam-----  | CL-ML, ML                | A-4              | 0                               | 100                                  | 95-100 | 90-100 | 75-95  | 18-35           | 2-10                     |
|                          | 11-25 | Silt loam, silty<br>clay loam.                                | CL-ML, CL                | A-4, A-6         | 0                               | 100                                  | 95-100 | 90-100 | 85-95  | 23-38           | 5-16                     |
|                          | 25-56 | Silt loam, silty<br>clay loam.                                | CL-ML, CL                | A-4, A-6,<br>A-7 | 0                               | 95-100                               | 90-100 | 85-100 | 80-95  | 23-42           | 5-20                     |
|                          | 56-72 | Silty clay loam,<br>silty clay,<br>cherty silty<br>clay loam. | MH, ML,<br>GC, CL,<br>SC | A-6, A-7         | 0-20                            | 65-100                               | 55-100 | 45-90  | 36-85  | 35-48           | 12-22                    |
| 47.*<br>Udorthents       |       |   |                          |                  |                                 |                                      |        |        |        |                 |                          |
| 48-----<br>Wrightsville  | 0-12  | Silt loam-----  | ML, CL,<br>CL-ML         | A-4              | 0                               | 100                                  | 95-100 | 90-100 | 75-100 | <31             | NP-10                    |
|                          | 12-61 | Silty clay, clay,<br>silty clay loam.                         | CH, CL                   | A-7              | 0                               | 100                                  | 100    | 95-100 | 90-100 | 41-65           | 22-40                    |
|                          | 61-72 | Silty clay loam,<br>silty clay,<br>clay.                      | CL, CH                   | A-7, A-6         | 0                               | 100                                  | 95-100 | 95-100 | 90-100 | 35-55           | 16-30                    |

\* See description of the map unit for composition and behavior characteristics of the map unit.



TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

| Map symbol and soil name  | Depth                         | Clay <2mm                        | Moist bulk density                               | Permeability                               | Available water capacity                         | Soil reaction                            | Shrink-swell potential                        | Erosion factors              |   | Organic matter |
|---------------------------|-------------------------------|----------------------------------|--|--|--|--|---|------------------------------|---|----------------|
|                           | In                            | Pct                              | G/cm <sup>3</sup>                                | In/hr                                      | In/in  | pH                                       |   | K                            | T | Pct            |
| 1-----<br>Barling         | 0-12<br>12-72                 | 8-17<br>10-17                    | 1.25-1.60<br>1.25-1.55                           | 0.6-2.0<br>0.6-2.0                         | 0.13-0.24<br>0.13-0.24                           | 5.1-6.5<br>4.5-6.5                       | Low-----<br>Low-----                          | 0.37<br>0.37                 | 5 | 1-4            |
| 2, 3-----<br>Bruno        | 0-6<br>6-72                   | 3-10<br>2-8                      | 1.20-1.40<br>1.20-1.40                           | 6.0-20<br>6.0-20                           | 0.10-0.15<br>0.05-0.10                           | 5.1-7.8<br>5.1-7.8                       | Low-----<br>Low-----                          | 0.17<br>0.17                 | 5 | .5-2           |
| 4-----<br>Cane            | 0-9<br>9-24<br>24-76          | 7-18<br>18-30<br>18-35           | 1.30-1.40<br>1.30-1.50<br>1.50-1.70              | 0.6-2.0<br>0.6-2.0<br>0.06-0.2             | 0.10-0.18<br>0.14-0.19<br>0.05-0.08              | 5.6-6.5<br>4.5-6.0<br>4.5-6.0            | Low-----<br>Low-----<br>Low-----              | 0.32<br>0.37<br>0.37         | 3 | .5-3           |
| 5, 6-----<br>Dardanelle   | 0-23<br>23-51<br>51-91        | 10-25<br>20-35<br>10-25          | 1.25-1.50<br>1.25-1.60<br>1.25-1.60              | 0.6-2.0<br>0.6-2.0<br>0.6-2.0              | 0.13-0.24<br>0.15-0.24<br>0.13-0.24              | 5.6-7.3<br>5.1-7.3<br>5.6-8.4            | Low-----<br>Moderate-----<br>Low-----         | 0.37<br>0.32<br>0.32         | 5 | 2-5            |
| 7, 8-----<br>Enders       | 0-7<br>7-48<br>48-56<br>56-62 | 10-25<br>35-60<br>35-60<br>---   | 1.25-1.60<br>1.15-1.45<br>1.20-1.45<br>---       | 0.6-2.0<br><0.06<br><0.06<br>---           | 0.07-0.15<br>0.12-0.18<br>0.08-0.10<br>---       | 3.6-5.5<br>3.6-5.5<br>3.6-5.5<br>---     | Low-----<br>High-----<br>Moderate-----<br>--- | 0.32<br>0.37<br>0.37<br>---  | 3 | .5-2           |
| 9-----<br>Enders          | 0-7<br>7-48<br>48-56<br>56-62 | 10-25<br>35-60<br>35-60<br>---   | 1.25-1.60<br>1.15-1.45<br>1.25-1.45<br>---       | 0.6-2.0<br><0.06<br><0.06<br>---           | 0.15-0.22<br>0.09-0.13<br>0.11-0.13<br>---       | 3.6-5.5<br>3.6-5.5<br>3.6-5.5<br>---     | Low-----<br>High-----<br>Moderate-----<br>--- | 0.43<br>0.24<br>0.24<br>---  | 3 | .5-2           |
| 10,* 11:*<br>Enders-----  | 0-7<br>7-48<br>48-56<br>56-62 | 10-25<br>35-60<br>35-60<br>---   | 1.25-1.60<br>1.15-1.45<br>1.20-1.45<br>---       | 0.6-2.0<br><0.06<br><0.06<br>---           | 0.07-0.15<br>0.12-0.18<br>0.08-0.10<br>---       | 3.6-5.5<br>3.6-5.5<br>3.6-5.5<br>---     | Low-----<br>High-----<br>Moderate-----<br>--- | 0.32<br>0.37<br>0.37<br>---  | 3 | 1-4            |
| Mountainburg----          | 0-6<br>6-15<br>15-17          | 4-12<br>10-18<br>---             | 1.30-1.60<br>1.30-1.60<br>---                    | 2.0-6.0<br>2.0-6.0<br>---                  | 0.05-0.10<br>0.05-0.10<br>---                    | 4.5-6.0<br>4.5-5.5<br>---                | Low-----<br>Low-----<br>---                   | 0.17<br>0.24<br>---          | 1 | 1-4            |
| 12-----<br>Guthrie        | 0-5<br>5-23<br>23-74          | 10-25<br>18-30<br>18-32          | 1.35-1.55<br>1.40-1.60<br>1.60-1.75              | 0.6-2.0<br>0.6-2.0<br>0.06-0.2             | 0.20-0.22<br>0.18-0.20<br>0.03-0.05              | 3.6-5.0<br>3.6-5.0<br>3.6-5.0            | Low-----<br>Low-----<br>Low-----              | 0.43<br>0.43<br>0.43         | 5 | 1-4            |
| 13, 14-----<br>Leadvale   | 0-6<br>6-24<br>24-56<br>56-72 | 12-22<br>30-32<br>20-35<br>30-45 | 1.30-1.40<br>1.30-1.50<br>1.55-1.70<br>1.40-1.60 | 0.6-2.0<br>0.6-2.0<br>0.06-0.6<br>0.06-0.6 | 0.17-0.22<br>0.17-0.20<br>0.06-0.11<br>0.06-0.11 | 4.5-5.5<br>4.5-5.5<br>4.5-5.5<br>4.5-5.5 | Low-----<br>Low-----<br>Low-----<br>Low-----  | 0.43<br>0.43<br>0.43<br>0.24 | 3 | .5-3           |
| 15:*<br>Leesburg-----     | 0-6<br>6-24<br>24-72          | 5-18<br>18-30<br>20-40           | ---<br>---<br>---                                | 2.0-6.0<br>0.6-2.0<br>0.6-2.0              | 0.08-0.16<br>0.09-0.18<br>0.09-0.18              | 4.5-5.5<br>4.5-5.5<br>4.5-5.5            | Low-----<br>Low-----<br>Low-----              | 0.24<br>0.32<br>0.32         | 5 | 1-4            |
| Enders-----               | 0-7<br>7-48<br>48-56<br>56-62 | 10-25<br>35-60<br>35-60<br>---   | 1.25-1.60<br>1.15-1.45<br>1.20-1.45<br>---       | 0.6-2.0<br><0.06<br><0.06<br>---           | 0.07-0.15<br>0.12-0.18<br>0.08-0.10<br>---       | 3.6-5.5<br>3.6-5.5<br>3.6-5.5<br>---     | Low-----<br>High-----<br>Moderate-----<br>--- | 0.32<br>0.37<br>0.37<br>---  | 3 | 1-4            |
| 16, 17, 18-----<br>Linker | 0-5<br>5-25<br>25-35<br>35-37 | 5-20<br>18-35<br>18-35<br>---    | 1.30-1.60<br>1.30-1.60<br>1.30-1.60<br>---       | 0.6-2.0<br>0.6-2.0<br>0.6-2.0<br>---       | 0.11-0.20<br>0.11-0.20<br>0.08-0.20<br>---       | 3.6-5.5<br>3.6-5.5<br>3.6-5.5<br>---     | Low-----<br>Low-----<br>Low-----<br>---       | 0.28<br>0.32<br>0.28<br>---  | 3 | .5-2           |

See footnote at end of table.

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

| Map symbol and soil name | Depth | Clay <2mm | Moist bulk density | Permeability | Available water capacity | Soil reaction | Shrink-swell potential | Erosion factors |   | Organic matter |
|--------------------------|-------|-----------|--------------------|--------------|--------------------------|---------------|------------------------|-----------------|---|----------------|
|                          |       |           |                    |              |                          |               |                        | K               | T |                |
|                          | In    | Pct       | G/cm <sup>3</sup>  | In/hr        | In/in                    | pH            |                        |                 |   | Pct            |
| 19,* 20:*                |       |           |                    |              |                          |               |                        |                 |   |                |
| Linker-----              | 0-5   | 5-20      | 1.30-1.60          | 0.6-2.0      | 0.11-0.20                | 3.6-5.5       | Low-----               | 0.28            | 3 | 1-4            |
|                          | 5-25  | 18-35     | 1.30-1.60          | 0.6-2.0      | 0.11-0.20                | 3.6-5.5       | Low-----               | 0.32            |   |                |
|                          | 25-35 | 18-35     | 1.30-1.60          | 0.6-2.0      | 0.08-0.20                | 3.6-5.5       | Low-----               | 0.28            |   |                |
|                          | 35-37 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| Mountainburg----         | 0-6   | 3-10      | 1.40-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-6.0       | Low-----               | 0.20            | 1 | 1-4            |
|                          | 6-15  | 15-25     | 1.50-1.70          | 2.0-6.0      | 0.05-0.10                | 4.5-5.5       | Low-----               | 0.17            |   |                |
|                          | 15-17 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| 21-----                  | 0-4   | 12-27     | 1.32-1.65          | 0.6-2.0      | 0.14-0.22                | 5.1-6.5       | Low-----               | 0.43            | 3 | .5-2           |
| McKamie                  | 4-42  | 35-60     | 1.20-1.45          | <0.06        | 0.18-0.20                | 4.5-6.0       | High-----              | 0.32            |   |                |
|                          | 42-72 | 14-35     | 1.40-1.76          | 0.2-2.0      | 0.14-0.22                | 4.5-8.4       | Moderate----           | 0.37            |   |                |
| 22-----                  | 0-20  | 39-50     | 1.20-1.50          | <0.06        | 0.18-0.20                | 6.1-7.8       | Very high----          | 0.32            | 5 | 2-5            |
| Moreland                 | 20-46 | 39-60     | 1.20-1.45          | <0.06        | 0.18-0.20                | 6.6-8.4       | High-----              | 0.32            |   |                |
|                          | 46-72 | 35-60     | 1.20-1.75          | <0.2         | 0.18-0.21                | 6.6-8.4       | Very high----          | 0.32            |   |                |
| 23, 24-----              | 0-6   | 3-10      | 1.40-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-6.0       | Low-----               | 0.20            | 1 | .5-2           |
| Mountainburg             | 6-15  | 15-25     | 1.50-1.70          | 2.0-6.0      | 0.05-0.10                | 4.5-5.5       | Low-----               | 0.17            |   |                |
|                          | 15-17 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| 25, 26-----              | 0-6   | 4-12      | 1.30-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-6.0       | Low-----               | 0.17            | 1 | 1-4            |
| Mountainburg             | 6-15  | 10-18     | 1.30-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-5.5       | Low-----               | 0.24            |   |                |
|                          | 15-17 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| 27, 28-----              | 0-10  | 10-27     | 1.25-1.50          | 0.6-2.0      | 0.16-0.24                | 4.5-6.0       | Low-----               | 0.43            | 5 | 1-3            |
| Muskogee                 | 10-25 | 20-40     | 1.25-1.45          | 0.2-0.6      | 0.16-0.24                | 4.5-6.0       | Moderate----           | 0.37            |   |                |
|                          | 25-72 | 30-55     | 1.20-1.45          | 0.06-0.2     | 0.14-0.18                | 4.5-7.8       | High-----              | 0.32            |   |                |
| 29, 30, 31-----          | 0-17  | 12-25     | 1.30-1.50          | 0.6-2.0      | 0.08-0.15                | 4.5-5.5       | Low-----               | 0.20            | 5 | .5-3           |
| Nella                    | 17-72 | 30-45     | 1.35-1.60          | 0.6-2.0      | 0.07-0.14                | 4.5-5.5       | Low-----               | 0.17            |   |                |
| 32,* 33:*                |       |           |                    |              |                          |               |                        |                 |   |                |
| Nella-----               | 0-17  | 12-25     | 1.30-1.50          | 0.6-2.0      | 0.08-0.15                | 4.5-5.5       | Low-----               | 0.20            | 5 | 1-4            |
|                          | 17-72 | 30-45     | 1.35-1.50          | 0.6-2.0      | 0.07-0.14                | 4.5-5.5       | Low-----               | 0.17            |   |                |
| Enders-----              | 0-7   | 10-25     | 1.25-1.60          | 0.6-2.0      | 0.07-0.15                | 3.6-5.5       | Low-----               | 0.32            | 3 | 1-4            |
|                          | 7-48  | 35-60     | 1.15-1.45          | <0.06        | 0.12-0.18                | 3.6-5.5       | High-----              | 0.37            |   |                |
|                          | 48-56 | 35-60     | 1.20-1.45          | <0.06        | 0.08-0.10                | 3.6-5.5       | Moderate----           | 0.37            |   |                |
|                          | 56-62 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| 34:*                     |       |           |                    |              |                          |               |                        |                 |   |                |
| Nella-----               | 0-17  | 12-25     | 1.30-1.50          | 0.6-2.0      | 0.08-0.15                | 4.5-5.5       | Low-----               | 0.20            | 5 | 1-4            |
|                          | 17-72 | 22-35     | 1.35-1.50          | 0.6-2.0      | 0.07-0.14                | 4.5-5.5       | Low-----               | 0.20            |   |                |
| Enders-----              | 0-7   | 10-25     | 1.25-1.60          | 0.6-2.0      | 0.15-0.22                | 3.6-5.5       | Low-----               | 0.43            | 3 | 1-4            |
|                          | 7-48  | 35-60     | 1.15-1.45          | <0.06        | 0.09-0.13                | 3.6-5.5       | High-----              | 0.24            |   |                |
|                          | 48-56 | 35-60     | 1.25-1.45          | <0.06        | 0.11-0.13                | 3.6-5.5       | Moderate----           | 0.24            |   |                |
|                          | 56-62 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| Mountainburg----         | 0-6   | 4-12      | 1.30-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-6.0       | Low-----               | 0.17            | 1 | 1-4            |
|                          | 6-15  | 10-18     | 1.30-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-5.5       | Low-----               | 0.24            |   |                |
|                          | 15-17 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| 35,* 36:*                |       |           |                    |              |                          |               |                        |                 |   |                |
| Nella-----               | 0-17  | 12-25     | 1.30-1.50          | 0.6-2.0      | 0.08-0.15                | 4.5-5.5       | Low-----               | 0.20            | 5 | 1-4            |
|                          | 17-72 | 22-35     | 1.35-1.50          | 0.6-2.0      | 0.07-0.14                | 4.5-5.5       | Low-----               | 0.17            |   |                |
| Mountainburg----         | 0-6   | 4-12      | 1.30-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-6.0       | Low-----               | 0.17            | 1 | 1-4            |
|                          | 6-15  | 10-18     | 1.30-1.60          | 2.0-6.0      | 0.05-0.10                | 4.5-5.5       | Low-----               | 0.24            |   |                |
|                          | 15-17 | ---       | ---                | ---          | ---                      | ---           | ---                    | ---             |   |                |
| 37, 38-----              | 0-6   | 10-27     | 1.25-1.50          | 0.6-2.0      | 0.20-0.22                | 4.5-5.5       | Low-----               | 0.43            | 5 | 2-4            |
| Pickwick                 | 6-30  | 20-40     | 1.25-1.50          | 0.6-2.0      | 0.17-0.20                | 4.5-5.5       | Low-----               | 0.37            |   |                |
|                          | 30-72 | 27-40     | 1.35-1.50          | 0.6-2.0      | 0.12-0.17                | 4.5-5.5       | Moderate----           | 0.37            |   |                |

See footnote at end of table.



TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

| Map symbol and soil name | Depth                           | Clay <2mm                       | Moist bulk density                               | Permeability                              | Available water capacity                         | Soil reaction                            | Shrink-swell potential                       | Erosion factors              |   | Organic matter |
|--------------------------|---------------------------------|---------------------------------|--|---|--|--|--|------------------------------|---|----------------|
|                          |                                 |                                 |  |   |  |  |  | K                            | T |                |
|                          | In                              | Pct                             | G/cm <sup>3</sup>                                | In/hr                                     | In/in  | pH                                       |  |                              |   | Pct            |
| 39-----<br>Rilla         | 0-6<br>6-47<br>47-72            | 14-27<br>18-35<br>20-50         | 1.30-1.80<br>1.30-1.80<br>1.20-1.80              | 0.6-2.0<br>0.6-2.0<br>0.6-2.0             | 0.21-0.23<br>0.20-0.22<br>0.18-0.22              | 4.5-7.3<br>3.6-5.5<br>4.5-8.4            | Low-----<br>Moderate-----<br>Low-----        | 0.37<br>0.32<br>0.32         | 5 | .5-4           |
| 40, 41-----<br>Roellen   | 0-11<br>11-42<br>42-80          | 35-50<br>40-60<br>25-60         | 1.40-1.55<br>1.40-1.55<br>1.40-1.60              | 0.06-0.2<br>0.06-0.2<br>0.06-2.0          | 0.15-0.19<br>0.14-0.17<br>0.14-0.20              | 5.6-7.8<br>5.6-7.8<br>5.6-7.8            | High-----<br>High-----<br>High-----          | 0.32<br>0.37<br>0.37         | 5 | 2-6            |
| 42, 43-----<br>Roxana    | 0-6<br>6-72                     | 5-27<br>10-18                   | 1.35-1.80<br>1.35-1.80                           | 0.6-2.0<br>0.6-2.0                        | 0.10-0.21<br>0.10-0.19                           | 6.1-8.4<br>6.6-8.4                       | Low-----<br>Low-----                         | 0.37<br>0.37                 | 5 | .5-2           |
| 44-----<br>Spadra        | 0-6<br>6-53<br>53-72            | 18-26<br>18-32<br>15-25         | 1.30-1.60<br>1.30-1.60<br>1.30-1.60              | 0.6-2.0<br>0.6-2.0<br>0.6-2.0             | 0.11-0.24<br>0.12-0.20<br>0.10-0.15              | 4.5-6.0<br>4.5-6.0<br>4.5-6.0            | Low-----<br>Low-----<br>Low-----             | 0.37<br>0.37<br>0.24         | 5 | 1-4            |
| 45: *<br>Spadra-----     | 0-6<br>6-68<br>68-72            | 18-26<br>18-32<br>15-25         | 1.30-1.60<br>1.30-1.60<br>1.30-1.60              | 0.6-2.0<br>0.6-2.0<br>0.6-2.0             | 0.11-0.24<br>0.12-0.20<br>0.10-0.15              | 4.5-6.0<br>4.5-6.0<br>4.5-6.0            | Low-----<br>Low-----<br>Low-----             | 0.37<br>0.37<br>0.24         | 5 | 1-4            |
| Ceda-----                | 0-4<br>4-72                     | 10-18<br>15-32                  | 1.20-1.35<br>1.25-1.40                           | 6.0-20<br>6.0-20                          | 0.04-0.11<br>0.01-0.10                           | 5.6-6.5<br>5.6-6.5                       | Low-----<br>Low-----                         | 0.17<br>0.28                 | 5 | .5-1           |
| 46-----<br>Taft          | 0-11<br>11-25<br>25-56<br>56-74 | 10-25<br>18-35<br>15-35<br>8-45 | 1.30-1.40<br>1.30-1.50<br>1.50-1.65<br>1.35-1.60 | 0.6-2.0<br>0.6-2.0<br>0.06-0.2<br>0.2-0.6 | 0.20-0.22<br>0.18-0.20<br>0.03-0.07<br>0.01-0.03 | 4.5-5.5<br>4.5-5.5<br>4.5-5.5<br>4.5-5.5 | Low-----<br>Low-----<br>Low-----<br>Low----- | 0.43<br>0.43<br>0.43<br>0.37 | 3 | 2-4            |
| 47: *<br>Udorthents      |                                 |                                 |  |   |  |  |  |                              |   |                |
| 48-----<br>Wrightsville  | 0-12<br>12-61<br>61-72          | 10-25<br>35-55<br>27-45         | 1.25-1.50<br>1.20-1.45<br>1.20-1.50              | 0.2-0.6<br><0.06<br><0.06                 | 0.16-0.24<br>0.14-0.22<br>0.14-0.22              | 3.6-5.5<br>3.6-5.5<br>3.6-8.4            | Low-----<br>High-----<br>High-----           | 0.49<br>0.37<br>0.43         | 5 | 1-3            |

\* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "rare," "brief," "apparent," and "perched." Absence of an entry indicates that the feature is not a concern]

| Map symbol and soil name    | Hydro-logic group | Flooding   |            |         | High water table |          |         | Bedrock     |           | Risk of corrosion |           |
|-----------------------------|-------------------|------------|------------|---------|------------------|----------|---------|-------------|-----------|-------------------|-----------|
|                             |                   | Frequency  | Duration   | Months  | Depth<br>Ft      | Kind     | Months  | Depth<br>In | Hard-ness | Uncoated steel    | Concrete  |
| 1-----<br>Barling           | C                 | Occasional | Very brief | Dec-Apr | 1.0-4.0          | Perched  | Dec-Apr | >60         | ---       | Moderate          | Moderate. |
| 2*-----<br>Bruno            | A                 | None-----  | ---        | ---     | 4.0-6.0          | Apparent | Dec-Apr | >60         | ---       | Low-----          | Low.      |
| 3-----<br>Bruno             | A                 | Occasional | Brief----- | Dec-Jun | 4.0-6.0          | Apparent | Dec-Apr | >60         | ---       | Low-----          | Low.      |
| 4-----<br>Cane              | C                 | None-----  | ---        | ---     | 2.0-3.0          | Perched  | Nov-Mar | >60         | ---       | Moderate          | High.     |
| 5, 6-----<br>Dardanelle     | B                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | >60         | ---       | Moderate          | Moderate. |
| 7, 8, 9-----<br>Enders      | C                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 40-60       | Soft      | High-----         | High.     |
| 10,* 11:*<br>Enders-----    | C                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 40-60       | Soft      | High-----         | High.     |
| Mountainburg-----           | D                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 12-20       | Hard      | Low-----          | Moderate. |
| 12-----<br>Guthrie          | D                 | Rare-----  | ---        | ---     | 0.5-1.0          | Perched  | Jan-Apr | >60         | ---       | High-----         | High.     |
| 13, 14-----<br>Leadvale     | C                 | None-----  | ---        | ---     | 2.0-3.0          | Perched  | Jan-Apr | >48         | Soft      | Moderate          | Moderate. |
| 15:*<br>Leesburg-----       | B                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | >60         | ---       | Low-----          | Moderate. |
| Enders-----                 | C                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 40-60       | Soft      | High-----         | High.     |
| 16, 17, 18-----<br>Linker   | B                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 20-40       | Hard      | Low-----          | High.     |
| 19,* 20:*<br>Linker-----    | B                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 20-40       | Hard      | Low-----          | High.     |
| Mountainburg-----           | D                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 12-20       | Hard      | Low-----          | High.     |
| 21-----<br>McKamie          | D                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | >60         | ---       | High-----         | Moderate. |
| 22-----<br>Moreland         | D                 | None-----  | ---        | ---     | 0-1.5            | Perched  | Dec-Apr | >60         | ---       | High-----         | Low.      |
| 23, 24-----<br>Mountainburg | D                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 12-20       | Hard      | Low-----          | High.     |
| 25, 26-----<br>Mountainburg | D                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 12-20       | Hard      | Low-----          | Moderate. |
| 27, 28-----<br>Muskogee     | C                 | None-----  | ---        | ---     | 1.0-2.0          | Perched  | Jan-Apr | >60         | ---       | High-----         | Moderate. |
| 29, 30, 31-----<br>Nella    | B                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | >60         | ---       | Moderate          | Moderate. |
| 32,* 33:*<br>Nella-----     | B                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | >60         | ---       | Moderate          | Moderate. |
| Enders-----                 | C                 | None-----  | ---        | ---     | >6.0             | ---      | ---     | 40-60       | Soft      | High-----         | High.     |

See footnotes at end of table.



TABLE 17.--SOIL AND WATER FEATURES--Continued

| Map symbol and soil name | Hydro-logic group | Flooding   |            |         | High water table   |          |         | Bedrock            |           | Risk of corrosion |           |
|--------------------------|-------------------|------------|------------|---------|--------------------|----------|---------|--------------------|-----------|-------------------|-----------|
|                          |                   | Frequency  | Duration   | Months  | Depth<br><u>Ft</u> | Kind     | Months  | Depth<br><u>In</u> | Hard-ness | Uncoated steel    | Concrete  |
| 34:*                     |                   |            |            |         |                    |          |         |                    |           |                   |           |
| Nella-----               | B                 | None-----  | ---        | ---     | >6.0               | ---      | ---     | >60                | ---       | Moderate          | Moderate. |
| Enders-----              | C                 | None-----  | ---        | ---     | >6.0               | ---      | ---     | 40-60              | Soft      | High-----         | High.     |
| Mountainburg-----        | D                 | None-----  | ---        | ---     | >6.0               | ---      | ---     | 12-20              | Hard      | Low-----          | Moderate. |
| 35,* 36:*                |                   |            |            |         |                    |          |         |                    |           |                   |           |
| Nella-----               | B                 | None-----  | ---        | ---     | >6.0               | ---      | ---     | >60                | ---       | Moderate          | Moderate. |
| Mountainburg-----        | D                 | None-----  | ---        | ---     | >6.0               | ---      | ---     | 12-20              | Hard      | Low-----          | Moderate. |
| 37, 38-----              | B                 | None-----  | ---        | ---     | >6.0               | ---      | ---     | >60                | ---       | Moderate          | Moderate. |
| Pickwick                 |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 39-----                  | B                 | None-----  | ---        | ---     | 4.0-6.0            | Apparent | Dec-Apr | >60                | ---       | Moderate          | High.     |
| Rilla                    |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 40**-----                | D                 | None-----  | ---        | ---     | 0-1.0              | Apparent | Jan-May | >60                | ---       | High-----         | Low.      |
| Roellen                  |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 41-----                  | D                 | Occasional | Brief----- | Jan-May | 0-1.0              | Apparent | Jan-May | >60                | ---       | High-----         | Low.      |
| Roellen                  |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 42**-----                | B                 | None-----  | ---        | ---     | 4.0-6.0            | Apparent | Dec-Apr | >60                | ---       | Low-----          | Low.      |
| Roxana                   |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 43-----                  | B                 | Occasional | Brief----- | Dec-Jun | 4.0-6.0            | Apparent | Dec-Apr | >60                | ---       | Low-----          | Low.      |
| Roxana                   |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 44-----                  | B                 | Occasional | Very brief | Dec-Apr | >6.0               | ---      | ---     | >60                | ---       | Low-----          | High.     |
| Spadra                   |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 45:*                     |                   |            |            |         |                    |          |         |                    |           |                   |           |
| Spadra-----              | B                 | Occasional | Very brief | Dec-Apr | >6.0               | ---      | ---     | >60                | ---       | Low-----          | High.     |
| Ceda-----                | B                 | Occasional | Very brief | Dec-Apr | >6.0               | ---      | ---     | >60                | ---       | Low-----          | Moderate. |
| 46-----                  | C                 | None-----  | ---        | ---     | 1.0-2.0            | Perched  | Jan-Apr | >60                | ---       | High-----         | High.     |
| Taft                     |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 47.*                     |                   |            |            |         |                    |          |         |                    |           |                   |           |
| Udorthents               |                   |            |            |         |                    |          |         |                    |           |                   |           |
| 48-----                  | D                 | None-----  | ---        | ---     | 0.6-1.5            | Perched  | Dec-Apr | >60                | ---       | High-----         | High.     |
| Wrightsville             |                   |            |            |         |                    |          |         |                    |           |                   |           |

\* See description of the map unit for composition and behavior characteristics of the map unit.

\*\* Soils are protected from flooding by levees.

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS

| Soil and sample number                       | Depth | Horizon | Particle-size distribution (percent less than 2.0 mm)        |                                  |                                       |                                  |                              |                         |
|--|-------|---------|--|----------------------------------|---------------------------------------|----------------------------------|------------------------------|-------------------------|
|  |       |         | Very coarse<br>sand through<br>medium sand<br>(2.0-0.25 mm.) | Fine sand<br>(0.25-<br>0.10 mm.) | Very fine sand<br>(0.10-<br>0.05 mm.) | Total sand<br>(2.0-<br>0.05 mm.) | Silt<br>(0.05-<br>0.002 mm.) | Clay<br>( $<0.002$ mm.) |
|  | In    |         |  |                                  |                                       |                                  |                              |                         |
| Linker fine sandy loam:<br>S-59-AR-58-1(1-4) | 0-5   | Ap      | 7.1  | 42.9                             | 12.2                                  | 61.5                             | 33.7                         | 4.8                     |
|  | 5-10  | B1      | 5.2  | 31.4                             | 9.2                                   | 45.8                             | 39.3                         | 14.9                    |
|  | 10-25 | B2t     | 4.7  | 26.3                             | 7.5                                   | 38.5                             | 35.8                         | 25.7                    |
|  | 25-35 | B3      | 12.7   | 33.8                             | 8.6                                   | 55.1                             | 26.5                         | 18.4                    |
| McKamie very fine sandy<br>loam:             | 0-2   | A11     | 2.3  | 7.2                              | 38.9                                  | 48.4                             | 44.7                         | 6.9                     |
|  | 2-4   | A12     | 2.1  | 6.5                              | 50.4                                  | 59.0                             | 33.3                         | 7.7                     |
|  | 4-18  | B21t    | 0.1  | 0.5                              | 15.8                                  | 16.4                             | 41.0                         | 42.6                    |
|  | 18-27 | B22t    | 0.3  | 0.8                              | 6.3                                   | 7.4                              | 47.1                         | 45.5                    |
|  | 27-42 | B23t    | 0.9  | 1.5                              | 5.6                                   | 8.0                              | 46.9                         | 45.1                    |
|  | 42-56 | IIC1    | 5.1  | 5.5                              | 10.9                                  | 21.5                             | 45.0                         | 33.5                    |
|  | 56-65 | IIC2    | 4.2  | 5.0                              | 10.7                                  | 19.9                             | 44.9                         | 35.2                    |
|  | 65-72 | IIC2    | 3.8  | 4.2                              | 10.2                                  | 18.2                             | 47.9                         | 33.9                    |
|  |       |         |  |                                  |                                       |                                  |                              |                         |
| Taft silt loam:<br>S-74-AR-115-5(1-9)        | 0-6   | Ap      | 2.8  | 2.7                              | 5.8                                   | 11.3                             | 69.2                         | 19.5                    |
|  | 6-11  | A2      | 2.5  | 2.1                              | 5.9                                   | 10.5                             | 67.1                         | 22.4                    |
|  | 11-19 | B2      | 2.0  | 1.9                              | 5.9                                   | 9.8                              | 65.9                         | 24.3                    |
|  | 19-25 | A'2     | 1.9  | 2.0                              | 5.7                                   | 9.6                              | 67.1                         | 23.3                    |
|  | 25-35 | B'x1    | 1.5  | 2.3                              | 6.1                                   | 9.9                              | 65.2                         | 24.9                    |
|  | 35-46 | B'x2    | 1.4  | 2.3                              | 6.0                                   | 9.7                              | 57.2                         | 33.1                    |
|  | 46-56 | B'x3    | 2.8  | 2.7                              | 6.9                                   | 12.4                             | 51.4                         | 36.2                    |
|  | 56-66 | B'21t   | 1.8  | 3.2                              | 7.0                                   | 12.0                             | 53.2                         | 34.8                    |
|  | 66-74 | B'22t   | 3.4  | 3.3                              | 6.8                                   | 13.5                             | 49.2                         | 37.3                    |
|  |       |         |  |                                  |                                       |                                  |                              |                         |
|  |       |         |  |                                  |                                       |                                  |                              |                         |



TABLE 19.--CHEMICAL ANALYSES OF SELECTED SOILS

| Soil name and sample number                         | Depth | Horizon | Extractable bases |               |               |               | Extractable acidity | Base saturation | Reaction<br>(1:1 soil to water) | Organic matter | Available phosphorus |
|---|-------|---------|-------------------|---------------|---------------|---------------|---------------------|-----------------|---------------------------------|----------------|----------------------|
|   |       |         | Ca                | Mg            | Na            | K             |                     |                 |                                 |                |                      |
|   | In    |         | Meg/<br>100 g     | Meg/<br>100 g | Meg/<br>100 g | Meg/<br>100 g | Meg/<br>100 g       | Pct             | pH                              | Pct            | P/m                  |
| Linker fine sandy loam:<br>S-59-AR-58-1(1-4)        | 0-5   | Ap      | 1.5               | 0.5           | <0.1          | 0.2           | 1.2                 | 65              | 6.5                             | 0.7            | ---                  |
|   | 5-10  | B1      | 2.5               | 0.6           | <0.1          | 0.3           | 3.4                 | 50              | 5.6                             | 0.4            | ---                  |
|   | 10-25 | B2t     | 2.0               | 0.8           | <0.1          | 0.2           | 8.7                 | 26              | 5.0                             | 0.3            | ---                  |
|   | 25-35 | B3      | 0.1               | 0.6           | <0.1          | 0.1           | 7.6                 | 10              | 4.8                             | 0.09           | ---                  |
| McKamie very fine sandy loam:<br>S-74-AR-115-6(1-8) | 0-2   | A11     | 2.0               | 0.8           | 0.2           | 0.2           | 6.1                 | 34              | 5.6                             | 1.7            | 5                    |
|   | 2-4   | A12     | 1.6               | 0.8           | 0.2           | 0.1           | 5.7                 | 36              | 5.5                             | 1.4            | 4                    |
|   | 4-18  | B21t    | 8.4               | 5.4           | 0.5           | 0.5           | 16.6                | 47              | 5.0                             | 0.7            | 5                    |
|   | 18-27 | B22t    | 7.2               | 5.3           | 0.6           | 0.5           | 18.0                | 43              | 4.9                             | 0.4            | 4                    |
|   | 27-42 | B23t    | 7.3               | 5.8           | 0.8           | 0.5           | 17.8                | 45              | 4.7                             | 0.3            | 5                    |
|   | 42-56 | IIC1    | 4.7               | 4.2           | 0.6           | 0.2           | 10.1                | 49              | 4.7                             | 0.3            | 4                    |
|   | 56-65 | IIC2    | 5.8               | 5.2           | 0.8           | 0.2           | 9.8                 | 55              | 4.8                             | 0.3            | 3                    |
|   | 65-72 | IIC2    | 7.3               | 5.7           | 0.9           | 0.3           | 9.4                 | 60              | 5.0                             | 0.3            | 3                    |
|   |       |         |                   |               |               |               |                     |                 |                                 |                |                      |
| Taft silt loam:<br>S-74-AR-115-5(1-9)*              | 0-6   | Ap      | 1.0               | 0.5           | 0.2           | 0.1           | 14.7                | 11              | 5.2                             | 2.7            | 6                    |
|   | 6-11  | A2      | 0.7               | 0.2           | 0.2           | 0.1           | 13.4                | 8               | 5.0                             | 1.9            | 5                    |
|   | 11-19 | B2      | 0.5               | 0.3           | 0.2           | 0.1           | 18.0                | 6               | 5.2                             | 1.0            | 5                    |
|   | 19-25 | A'2     | 0.5               | 0.3           | 0.3           | 0.1           | 10.3                | 10              | 5.3                             | 0.7            | 5                    |
|   | 25-35 | B'x1    | 0.5               | 0.4           | 0.4           | 0.1           | 10.3                | 12              | 5.6                             | 0.4            | 4                    |
|   | 35-46 | B'x2    | 0.5               | 0.7           | 0.4           | 0.1           | 15.9                | 10              | 5.5                             | 0.5            | 5                    |
|   | 46-56 | B'x3    | 0.6               | 1.0           | 0.5           | 0.1           | 16.2                | 12              | 5.6                             | 0.3            | 5                    |
|   | 56-66 | B'21t   | 0.8               | 1.4           | 0.7           | 0.1           | 15.1                | 17              | 5.5                             | 0.4            | 4                    |
|   | 66-74 | B'22t   | 0.9               | 1.7           | 0.7           | 0.1           | 18.9                | 16              | 5.4                             | 0.3            | 4                    |
|   |       |         |                   |               |               |               |                     |                 |                                 |                |                      |

\* Reaction is within 0.1 of a unit for the range of reaction for this series and within normal range of test observations.

## Pope County, Arkansas

TABLE 20.--ENGINEERING INDEX TEST DATA

[Tests performed by Arkansas State Highway Department, in cooperation with the Bureau of Public Roads, U.S. Department of Commerce, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO)]

| Soil name<br>and<br>location   | Arkansas<br>State<br>Highw.<br>Lab. No.<br>S74Ar-<br>115- | Classification      |                      | Depth<br>from<br>surface | Moisture<br>density<br>data <sup>1</sup> |                     | Mechanical analyses <sup>2</sup> |                        |                          | Liquid<br>limit | Plasticity<br>index |
|--|---|---------------------|----------------------|--------------------------|--|---------------------|----------------------------------|------------------------|--------------------------|-----------------|---------------------|
|  |   | AASHTO <sup>3</sup> | Unified <sup>4</sup> |                          | Maximum<br>dry<br>density                | Optimum<br>moisture | Percentage passing<br>sieve--    |                        |                          |                 |                     |
|  |   |                     |                      |                          |  |                     | No. 10<br>(2.0<br>mm)            | No. 40<br>(0.42<br>mm) | No. 200<br>(0.074<br>mm) |                 |                     |
|  |   |                     |                      | Inches                   | Lb/ft <sup>3</sup>                       | Pct                 |                                  |                        |                          | Pct             |                     |
| Cane loam:<br>SW1/4SE1/4NE1/4, sec.<br>32, T. 8 N., R. 20 W.         | 1-3   | A-6(9)              | CL                   | 9-24                     | 116                                      | 15                  | 99                               | 98                     | 84                       | 30              | 12                  |
|  | 1-4   | A-6(10)             | CL                   | 24-37                    | 112                                      | 17                  | 100                              | 100                    | 76                       | 33              | 15                  |
|  | 1-6   | A-6(13)             | CL                   | 48-64                    | 110                                      | 18                  | 100                              | 100                    | 85                       | 37              | 15                  |
| McKamie silt loam:<br>NE1/4SW1/4NE1/4, sec.<br>15, T. 6 N., R. 19 W. | 6-3   | A-7-6(36)           | CH                   | 4-18                     | 101                                      | 22                  | 100                              | 100                    | 98                       | 55              | 33                  |
|  | 6-4   | A-7-6(28)           | CL                   | 18-27                    | 105                                      | 21                  | 100                              | 99                     | 95                       | 45              | 28                  |
|  | 6-6   | A-6(13)             | CL                   | 42-56                    | 112                                      | 17                  | 94                               | 88                     | 78                       | 35              | 18                  |
| Taft silt loam:<br>NE1/4SE1/4NE1/4 sec.<br>10, T. 7 N., R. 20 W.     | 4-2   | A-4(9)              | ML                   | 6-11                     | 103                                      | 19                  | 98                               | 95                     | 90                       | 35              | 9                   |
|  | 4-4   | A-4(5)              | CL-ML                | 19-25                    | 110                                      | 17                  | 97                               | 91                     | 86                       | 28              | 7                   |
|  | 4-6   | A-6(15)             | CL                   | 35-46                    | 105                                      | 21                  | 96                               | 92                     | 87                       | 40              | 16                  |

<sup>1</sup>Based on AASHTO Designation: T 99-57, Method A (12)

<sup>2</sup>Mechanical analysis according to AASHTO Designation T 88-57 (12). Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

<sup>3</sup>Based on AASHTO Designation M 145-66 (12).

<sup>4</sup>Based on ASTM Designation D 2487-66T.



TABLE 21.--CLASSIFICATION OF THE SOILS

| Soil name         | Family or higher taxonomic class                              |
|-------------------|---|
| Barling-----      | Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts       |
| Bruno-----        | Sandy, mixed, thermic Typic Udifluvents                       |
| Cane-----         | Fine-loamy, siliceous, thermic Typic Fragiudults              |
| Ceda-----         | Loamy-skeletal, siliceous, nonacid, thermic Typic Udifluvents |
| Dardanelle-----   | Fine-silty, mixed, thermic Typic Argiudolls                   |
| Enders-----       | Clayey, mixed, thermic Typic Hapludults                       |
| Guthrie-----      | Fine-silty, siliceous, thermic Typic Fragiagults              |
| Leadvale-----     | Fine-silty, siliceous, thermic Typic Fragiudults              |
| Leesburg-----     | Fine-loamy, siliceous, thermic Typic Paleudults               |
| Linker-----       | Fine-loamy, siliceous, thermic Typic Hapludults               |
| McKamie-----      | Fine, mixed, thermic Vertic Hapludalfs                        |
| *Moreland-----    | Fine, mixed, thermic Vertic Hapludolls                        |
| Mountainburg----- | Loamy-skeletal, siliceous, thermic Lithic Hapludults          |
| Muskogee-----     | Fine-silty, mixed, thermic Aquic Paleudalfs                   |
| Nella-----        | Fine-loamy, siliceous, thermic Typic Paleudults               |
| Pickwick-----     | Fine-silty, mixed, thermic Typic Hapludults                   |
| Rilla-----        | Fine-silty, mixed, thermic Typic Hapludalfs                   |
| Roellen-----      | Fine, montmorillonitic, thermic Vertic Haplaquolls            |
| Roxana-----       | Coarse-silty, mixed, nonacid, thermic Typic Udifluvents       |
| Spadra-----       | Fine-loamy, siliceous, thermic Typic Hapludults               |
| Taft-----         | Fine-silty, siliceous, thermic Glossaquic Fragiudults         |
| Wrightsville----- | Fine, mixed, thermic Typic Glossaqualfs                       |

\* Taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

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